Vol. 52 In 2 Parts ... Part One No. 3

CHEMICAL INDUSTRIES

The Chemical Business Magazine

FIGHTING FOR THEIR FUTURE

There would be no future worth having if we could not build for the happiness of our children. It is their heritage which Industry and the Armed Forces of America are working and fighting to protect!

SOLVAY SALES CORPORATION

The Business Magazine for Makers & Users of Chemicals
Management, Research Production, Marketing

CHEMICAL INDUSTRIES

Contents

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MARCH, 1943

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THE CHEMICAL COMPOUND THAT OUTDID

Rip Van Winkle

• Commercially, *sodium chlorite* was asleep for 100 years. It was not until 1941 that it came into its own – when it was first produced in commercial quantities at Mathieson's new chlorite plant at Niagara Falls. Fourteen years of intensive research and practical experimentation by the Mathieson technical staff had preceded the actual construction and operation of the plant.

Long known to chemists by the formula $NaClO_2$, sodium chlorite has unusual oxidizing powers which make it an invaluable bleaching and processing agent. Today sodium chlorite is widely used in the paper and textile industries. It has successfully demonstrated its ability to bleach paper pulp and textiles to high whites without loss in tensile strength – a result that no other known processing agent has been able to achieve. Non-hygroscopic and readily soluble in water, sodium chlorite is highly stable both in solution and in solid form . . . can be heated to 150 degrees C. without decomposition.

Every day this exclusive Mathieson product is finding new applications in American industry – at a time when progress and production are as vital to victory as all-out offensives on the fighting fronts.

DO YOU KNOW THESE FOUR SODIUM CHLORITE PRODUCTS?

- *Textone* for textiles
- *C2* for paper pulp processing
- *Sodium Chlorite Technical* for general commercial oxidation and processing
- And, of course, the *pure analytical grade* used as a laboratory reagent

Mathieson CHEMICALS

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LIQUID CHLORINE . . . SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . BLEACHING POWDER . . . HTH PRODUCTS . . . AMMONIA, ANHYDROUS and AQUA . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE. . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS

BETWEEN THE LINES

Alcohol From Waste Sulfite Liquor

Government observers and the paper industry are watching with great interest the construction of a plant by the Ontario Paper Company at Thorold, Ontario, for the production of alcohol from waste sulfite liquor. Estimating a yield of 12 gallons of alcohol per ton of pulp, there are enough mills in the U. S. producing sulfite liquor to make 35,000,000 gallons of alcohol a year.

SIGNS point to a revived interest in the United States in sulfite liquor production and utilization. Most of this interest, it must be admitted, is among Congressmen seeking outlets for wood or agricultural products, but the matter is at present under close examination by at least one Congressional Committee.

Sulfite waste liquor is a by-product of sulfite pulp, and is commonly discarded by any convenient means in this country. As reported by a United States forest service expert, Dr. J. Alfred Hall, to members of Congress however, several European countries, Sweden, Norway, Germany, Finland, Poland, among them, all forested countries, have attempted to make practical use of this by-product. They have in the past, developed plants for making both alcohol and protein foods, from this "waste."

Prior to the First World War the West Virginia Pulp and Paper Company laid rather large-scale plans for a plant at Mechanicsville, N. Y., having a capacity of approximately 2,750,000 gallons of alcohol a year from sulfite waste liquor output of a 140-ton pulp mill. For various reasons the project did not pan out, and it was not until the past year that any substantial effort was renewed in this field.

During 1942 however, it is reported reliably that at least three proposals for such plants to convert sulfite liquor were laid before the War Production Board.

The three proposed plants, it is understood, were rejected because they would require critical materials that could not be spared. However, one of these was to be a Canadian plant, and it may contain some kind of moral that the Canadian authorities later encouraged its sponsors to go ahead, promising that materials would be found.

This plant is being built, the project of the Ontario Paper Company at Thorold, Ontario, and is scheduled to be producing by some time in April. According to Dr. Hall's information, it is being well-built, and will operate efficiently. The engineer in charge is described as a Polish specialist, a Dr. Rosten, who has discussed similar plans in Washington at an earlier date. Costs are projected at about 20 cents a gallon, but there are some special factors in this figure.

The paper company has some power available and will "lend" this power to its plant. The latter, by an efficient recovery of heat which is piped back to the paper plant for its use, balances the cost of power involved. This plant will produce, according to expectations, in the neighborhood of 900,000 gallons of alcohol annually.

(Cellulose is the main product of the "sulfite process" but a percentage of sugar is released in the procedure. This is blown off into some nearby stream, usually, in the United States, in the waste. The sugar content of this waste liquid is estimated at 2 per cent, and approximately three-fourths of this percentage is believed recoverable.)

Further expansion of this industry obviously would revolve about the available liquor from the primary processes. However, Dr. Hall states that there are enough mills in the United States producing sulfite liquor to produce 35,000,000 gallons of alcohol per year, using an estimate of 12 gallons of alcohol per ton of pulp.

It was pointed out further in recent discussions that some of these mills are small, producing 30, 40 or 50 tons per day, and it would not be advisable to attempt to install conversion facilities at all of them. There are an estimated 39 or 40 mills, not allowing for day-to-day curtailments, producing 100 tons daily, and these could produce a calculated 25,000,000 gallons per year.

The Department of Agriculture is understood to be awaiting the outcome of the Toronto company's efforts, rather than attempt experimental plans in this country, but the same Dr. Rosten, of that company, is reported to have been asked to design a plant for a Northwestern Pacific coast concern. This organization is among those which failed to get any encouragement from the War Production Board earlier. It still has no assurance of priority assistance, according to information available. As the Department of Agriculture expert put the matter, such applications in the past "have not met with great favor."

As to actual alcohol extraction, there are three processes of producing sugar from wood by hydrolysis; the old Bergus process (German) which used a highly concentrated hydrochloric acid, and is now considered impractical because of a stringency in metals; the Scholler process, "adapted" by Germany, and the so-called American process which was used to produce about 6,000,000 gallons of alcohol annually in the First World War, at southern plants.

CALENDAR OF EVENTS

April 6-8, American Society of Civil Engineers, Board of Directors' Meeting, Dallas, Texas.

April 7, American Institute of Consulting Engineers, Luncheon & Council Meeting, Engineers Club, New York, N. Y.

April 8-9, American Institute of Electrical Engineers. North Eastern District Technical Meeting, Pittsfield, Mass.

April 8-9, American Petroleum Institute. Eastern District Spring Meeting, Division of Production, William Penn Hotel, Pittsburgh, Pa.

April 12-16, American Chemical Society, Semi-annual Spring Meeting, Detroit, Mich.

April 13-16, American Management Association (Packaging Conference) Astor Hotel, New York, N. Y.

Wk. of April 19, The American Ceramic Society, 45th Annual Meeting—War Congress—William Penn Hotel, Pittsburgh, Pa.

April 20-23, National Electrical Manufacturers Assoc. (Spring Meeting) Palmer House, Chicago, Ill.

April 26, Assn. of Consulting Chemists & Chemical Engineers, Inc. Discussion of Kilgore Bill, The Chemists' Club, New York, N. Y.

April 26-28, The American Society of Mechanical Engineers, Spring Meeting, Hotel Blackhawk, Davenport, Iowa.

April 27-29, American Wood Preservers' Association, 39th Annual Meeting, Cincinnati, O.

April 28-30, American Institute of Electrical Engineers. South-West District Technical Meeting, Kansas City, Mo.

May 2-4, American Drug Manufacturers Assoc., Annual Convention, Palmer House, Chicago, Ill.

May 7, American Chemical Society, New York Section.

May 10-11, American Institute of Chemical Engineers, 35th Semi-annual Meeting, Waldorf-Astoria Hotel, New York, N. Y.

May 10-14, National Fire Protection Association, Palmer House, Chicago, Ill.

May 21-23, (Tentative) Westinghouse Agent-Jobbers Association, (31st General Meeting) The Homestead, Hot Springs, Va.

May 26-28, (Tentative) National Metal Trades Association, 45th Annual Convention, Palmer House, Chicago, Ill.

June 2-3, The American Leather Chemists' Association, Annual Meeting, Hotel Statler, Buffalo, N. Y.

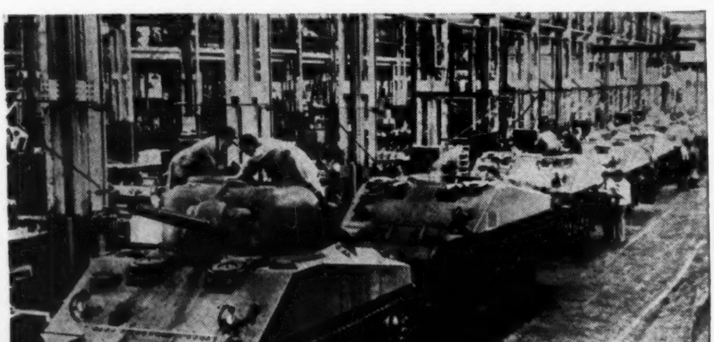
June 5, American Chemical Society, New York Section, Annual Outing.

LIFE On The

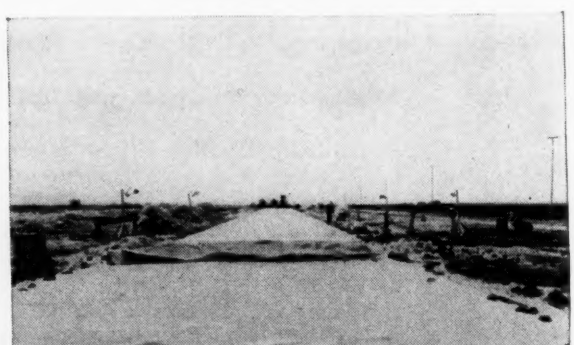
PHOTO BY U. S. ARMY SIGNAL CORPS

(Above) **TO SMOKE OUT THE AXIS** and screen Allied operations from enemy eyes, this unit is being drilled in the use of a chemical mortar. Do *your* part to help these men by investing in War Bonds or Stamps regularly every pay day. The purchase of a $25 bond for only $18.75 will supply one (empty) shell for this mortar and bring America one step nearer to Victory.

(Above) **NEW FURNITURE STYLES** of "knockdown" design are made of wood to save metal. To meet today's needs for modern furniture finishes, Cyanamid offers many excellent "alternate" materials to replace those items that are now on the "essential" list.

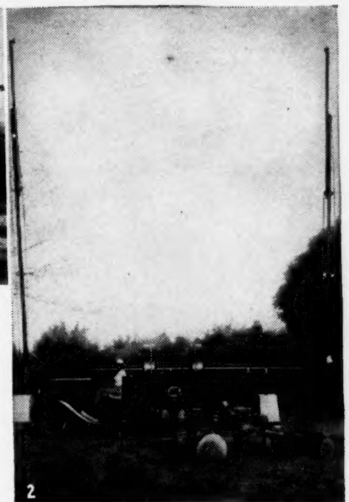


(Above) **HARD-HITTING M-4 TANKS** roll off the assembly line on their way to the battlefront. Cyanamid's AEROCARB* and AEROCARB Deep-Case Carburizing Compounds are applicable to the strengthening of vital parts in the manufacturing of these monsters. In baths remarkable for chemical stability, these compounds provide rapid case penetration and superior metallurgical results at a minimum cost. War uses include aircraft motor gears, power transmission parts and gun mechanisms.

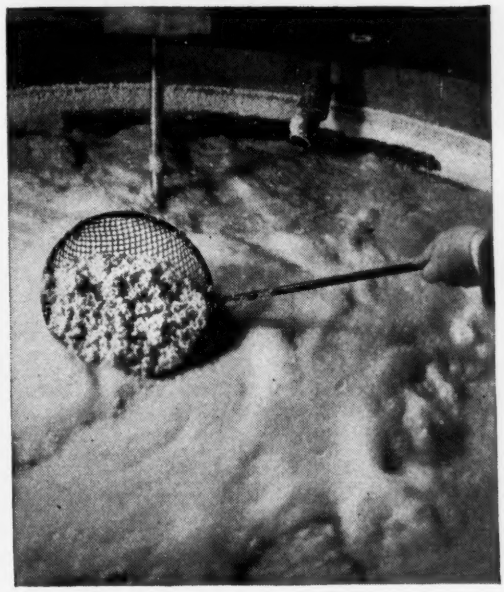


(Above) **PAPER PROTECTS AIRPLANE RUNWAYS.** To help prevent a freshly laid concrete runway from freezing, a large paper covering was laid over it at an Army Air Base. Many new "outdoor" uses for paper are being made possible by the high wet strength imparted by a new Cyanamid resin which can be added directly to the beater in regular paper-making process without special equipment.

Chemical Newsfront

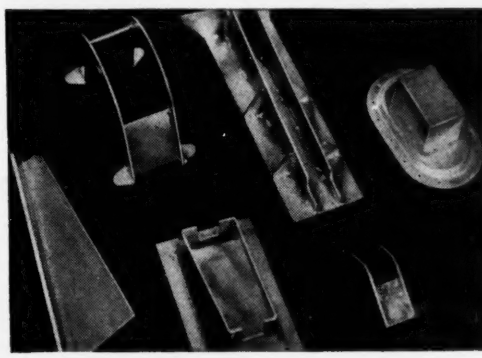


(*Above and right*) **DEATH TO INSECTS** in the country's citrus orchards is assured by fumigation with Cyanamid's HCN. The process involves covering the trees with a tent to hold the hydrocyanic acid vapor in contact with all parts of the trees for 45 minutes—sufficient time to kill all scale insects. To aid in the task a mechanical "tent-puller" is used to get the tent into place. As shown in the photos: (1) With poles collapsed the machine can be driven from grove to grove. (2) When erected, poles stretch into the air commensurate with the height of the tree and (3) can easily place the 70-foot fumigation tent in position. The most effective and most economical of all modern fumigants, HCN is not only used to protect fruit trees but also in such industries as food processing and flour milling where complete insect control is absolutely essential.



(*Above*) **NOT COTTAGE CHEESE,** but the latex of synthetic rubber is shown here after it has been coagulated with an acid solution. Aiding today's urgent program of synthetic rubber production is Cyanamid's comprehensive line of essential chemicals to serve the rubber industry.

(*Above*) **AMERICA'S FIRST "ALL-WOOD" TRANSPORT PLANE,** the newly completed Curtiss (C-76) Caravan. Composed of plain wood and molded plywood bonded with synthetic resins, this type of construction not only conserves many strategic materials but produces a lighter, faster plane. The low cargo floor facilitates rapid loading and unloading. URAC** and MELMAC* Adhesives made by American Cyanamid are designed for use in "molded" plywood construction and similar applications for permanently bonding wood, fabric, and paper.



(*Above*) **LIGHTER, STIFFER AIRPLANE PARTS** can now be formed thanks to *Heliarc*—a process that makes it possible to weld magnesium and other "difficult" alloys into simple shapes. Helium, used as a shield to prevent magnesium from igniting, is also said to prevent heat accumulation, keep welds cool, and provide high penetration.

*Reg U. S. Pat. Off. **Trade Mark

American Cyanamid & Chemical Corporation

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WASHINGTON

By T. N. Sandifer

THE year-long conflict at Washington over synthetic rubber production will bear close attention from the industry for a while.

Rubber Program

The whole program is undergoing revision. The direction of the change is generally downward, but certain other significant trends are becoming evident. A straw was the action of War Production Board around the end of February revoking preference ratings for construction of butadiene production facilities at a Texas City, Tex., plant. Other such plant conversions are scheduled to be halted by similar action. On the other hand, pilot plants using alcohol processes are likely to be encouraged.

T.N. Sandifer

In short, processes using raw materials drawn from farm surplus products are winning out. This outcome does not either confirm or deny the merits of any process. It simply is an evolution influenced by certain factors.

About a year ago, a recommendation was made from within what is now WPB, for an overall rubber production organization to function as a part of this agency. Nothing came of it. As the various plans for rubber production by different processes have been put forward, however, the War Production Board has naturally occupied a strategic place. It could deny priorities, or its experts, as in the Chemical branch, now a division, could rule one way or another on the feasibility of proposed plans.

One consequence is that as time has passed, and the public has become increasingly anxious over the possibility of new rubber, the Chemical division of WPB has found itself sharing any blame, as far as Congress is concerned, for the failure to have a program going. The division is suspected in Congress of favoring special interests, or pet processes, to the end that an adequate rubber supply at any foreseeable, practicable date, is highly conjectural.

None of these suspicions may be justified, but simply through evolution, Chemical division is now on one side of the issue as a "bureaucracy" and Congressional blocs on the other. When a Congressman uses the term "bureaucracy" today, he can be sure of a hearing. One aspect of this situation directly affects the industry. To the extent that the Chemical division is identified with the industry in the public's mind, in this controversy, the industry will suffer.

The butadiene projects have been attacked in Washington as not being conversions of existing facilities to make rubber, but whole new plants, using critical equipment. On this ground it has been possible to force a change of attitude toward them, and to order work stopped on their development. On the other hand, no one process of making rubber seems to have been definitely decided on. On both sides of the fence, as to the best process, there have been several variations. In the cases of some proposed methods, the process ran squarely into the expanded demand for high octane aviation gas; in others, there were technical difficulties.

However, if a shift should be made to full-scale production of synthetic rubber using ethyl alcohol, the storage problem for that commodity would soon be solved —the stocks would disappear rapidly enough.

Alcohol

Certain official actions have taken place on alcohol recently that deserve mention, though not immediately connected with synthetic rubber production. The existing price schedule has been expanded by the Office of Price Administration to cover producers' sales of all formulae, when sold in 50-gallon quantities or more, instead of the 500-gallon minimum as formerly. The price was lowered slightly, also, to take into account the shift to an f.o.b. basis, instead of the formerly prevailing freight-equalization arrangement. Another action has speeded up the conversion of tank cars from the wine industry to alcohol transportation. This transfer is being accomplished gradually, however.

Meanwhile, the increasing pressure on all basic chemical materials has led the WPB to caution all chemical consumers to furnish suppliers with complete information as to proposed end uses. This will accelerate supplies where they are for essential use, it is explained, and conserve others for such use, if non-essentials are weeded out.

Supply Situation

The easier situation on nitrocellulose supplies which was noted in February is expected to continue into March. Phenol resins continue tight, as do also the supplies of fats and oils. Food rationing will intensify the pressure on edible oils, particularly. Under General Preference Order M-287, deliveries of anhydrous aluminum chloride will be closely restricted, except for 50 pounds or under in any one month. Beginning in April, authorizations for either acceptance or delivery will be subject to applications filed by the 15th of the preceding month.

The quantity of drying oils for protective coatings for civilian use is being drastically revised, and quotas under M-71 are shortly to be re-adjusted, it is stated here. Supplies of casein for water paints are reduced, with little prospect for an increase. Plans were laid the past month to make available limited supplies of shellac for aniline inks, where satisfactory substitutes can not be used.

Potash has been put under allocation, and preliminary action looking to allocation of edible oils has been reported here.

Under the new Allocation Order M-25 persons buying more than 555 lbs. of formaldehyde must make application on standard chemical form PD-600. Smaller quantities are exempt it they are not to be used in resins for plastics, adhesives or protective coatings.

Beeswax

Because the demand for industrial waxes used for a variety of war purposes—such as waterproofing of tarpaulins, tenting materials, gas masks, airplane fabrics and the coating of artillery shells—has caused importers to supplement their supplies of beeswax from sources not covered by the original price control regulation on this important commodity, OPA has extended this control to *all* imported beeswaxes, regardless of source. The original regulation applied only to domestic waxes and those imported from South America, Mexico and Africa

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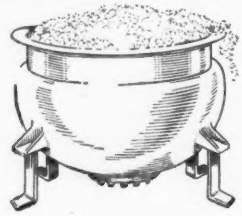

The Bubble Bath Nobody Wanted

No, it was not a Saturday night soak in restful luxury—quite the contrary. Overflowing kettles of foaming licorice produced a bubble bath far from pleasant and created a problem that baffled users of licorice.

Licorice processors needed an answer badly. They sought an agent that not only would control foaming, but would be non-toxic and suitable for human consumption.

Atlas gave the answer in Span No. 20—one of the new Atlas series of emulsifiers, Atlas Spans and Atlas Tweens. A few ounces of this surface active partial fatty acid ester in a tank of the recalcitrant licorice, made the surface as smooth as the old swimming hole!

Cutting the foam of licorice solutions probably is no worry of yours. But it is a good example of the amazing way in which the special properties of Spans and Tweens fit all sorts of situations.

You may have an unusual problem now or in the days ahead for which Spans and Tweens can offer a solution. The chart below describes some typical esters. Literally, thousands of modifications and combinations are possible. Spans and Tweens can be tailor-made to do specific jobs.

If your problem involves emulsifiers, detergents and wetting agents, it is probable that a close inspection of Atlas Spans and Atlas Tweens will be more than worthwhile. Your request will bring samples and technical literature promptly.

ATLAS ESTER	FORM	SOLUBILITY at 25° C.							
		WATER	HARD WATER 200 ppm	H_2SO_4 5%	TOLUOL	MINERAL OIL	CORN OIL	DIETHYL ETHER	ETHYL ALCOHOL
Span 20	Oily Liquid	D	D	D	D	S	S(H)	S(H)	S
Span 40	Waxy Solid	I	D	I	D	S(H)	S	SS	I
Span 60	Waxy Solid	I	D	I	SW	S(H)	S	SS	SS
Span 80	Oily Liquid	D	D	I	S	S	S(H)	SS	S
Span 85	Oily Liquid	D	D	I	S	S	S	S	S
Tween 20	Oily Liquid	S	S	S	S	I	I	I	S
Tween 40	Oily* Liquid	S	S	S	S	I	I	I	S
Tween 60	Oily* Liquid	S	S	S	S	I	I	SS	S
Tween 61	Waxy Solid	I	D	I	S	S(H)	S	S	S
Tween 80	Oily Solid	S	S	S	S	I	I	D	S
Tween 81	Oily Liquid	D	D	D	S(H)	S	S	D	S
Tween 85	Oily* Liquid	D	D	D	S	S(H)	S	SS	S

*Tends to gel on standing

S=Soluble · SS=Slightly Soluble · SW=Soluble Warm (50°C.) · S(H)=Soluble, but Hazy · D=Dispersible · I=Insoluble

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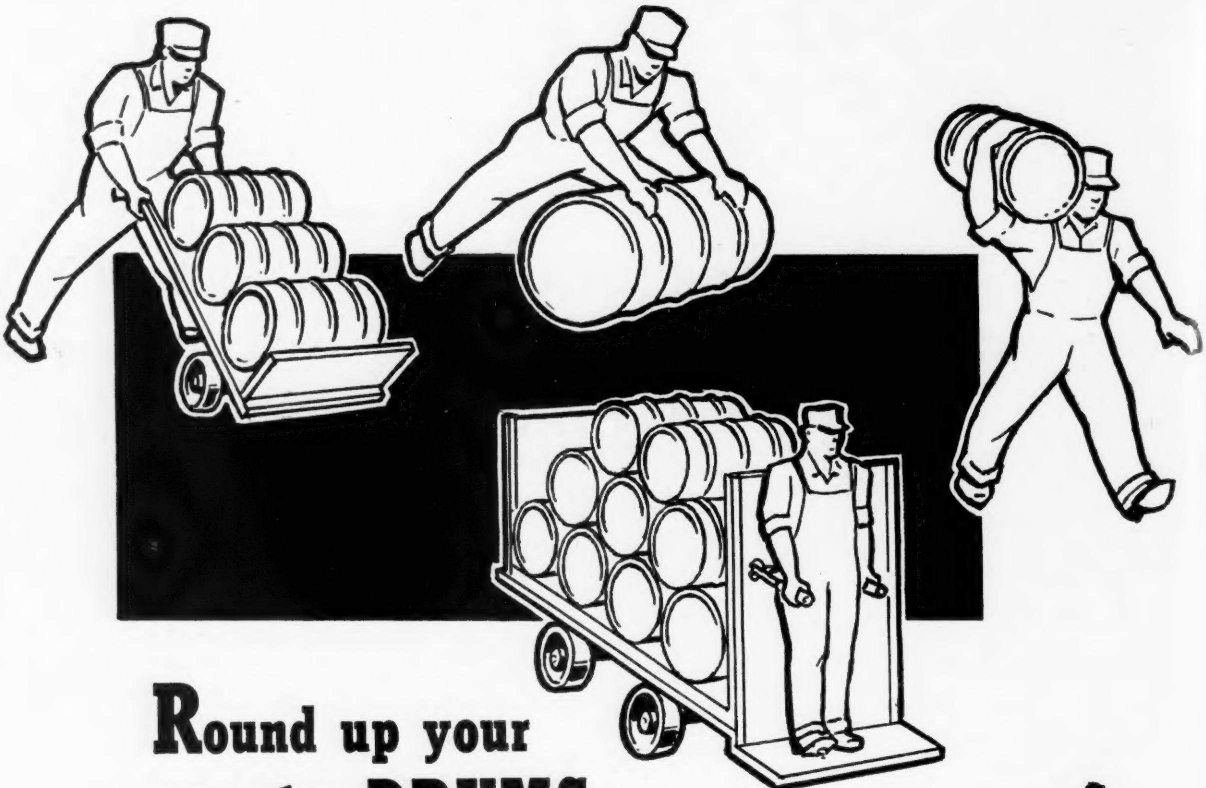
WAR or PEACE



Round up your empty DRUMS and *Ship them Back!*

You can conserve vitally-needed steel by keeping your empty drums on the move! Don't use serviceable drums for waste-receptacles or shipping containers for other materials. Handle them with care, empty them as promptly as possible; see that tops and bungs are tight when you return them; send back all drums just as soon as you can.

And here is another good conservation measure: make full use of Standard Technical Service and the complete line of Standard Silicates in your plant. In this way, you will be assured of the most efficient use of your materials.

ALKALI

DIAMOND ALKALI COMPANY • Standard Silicate Division

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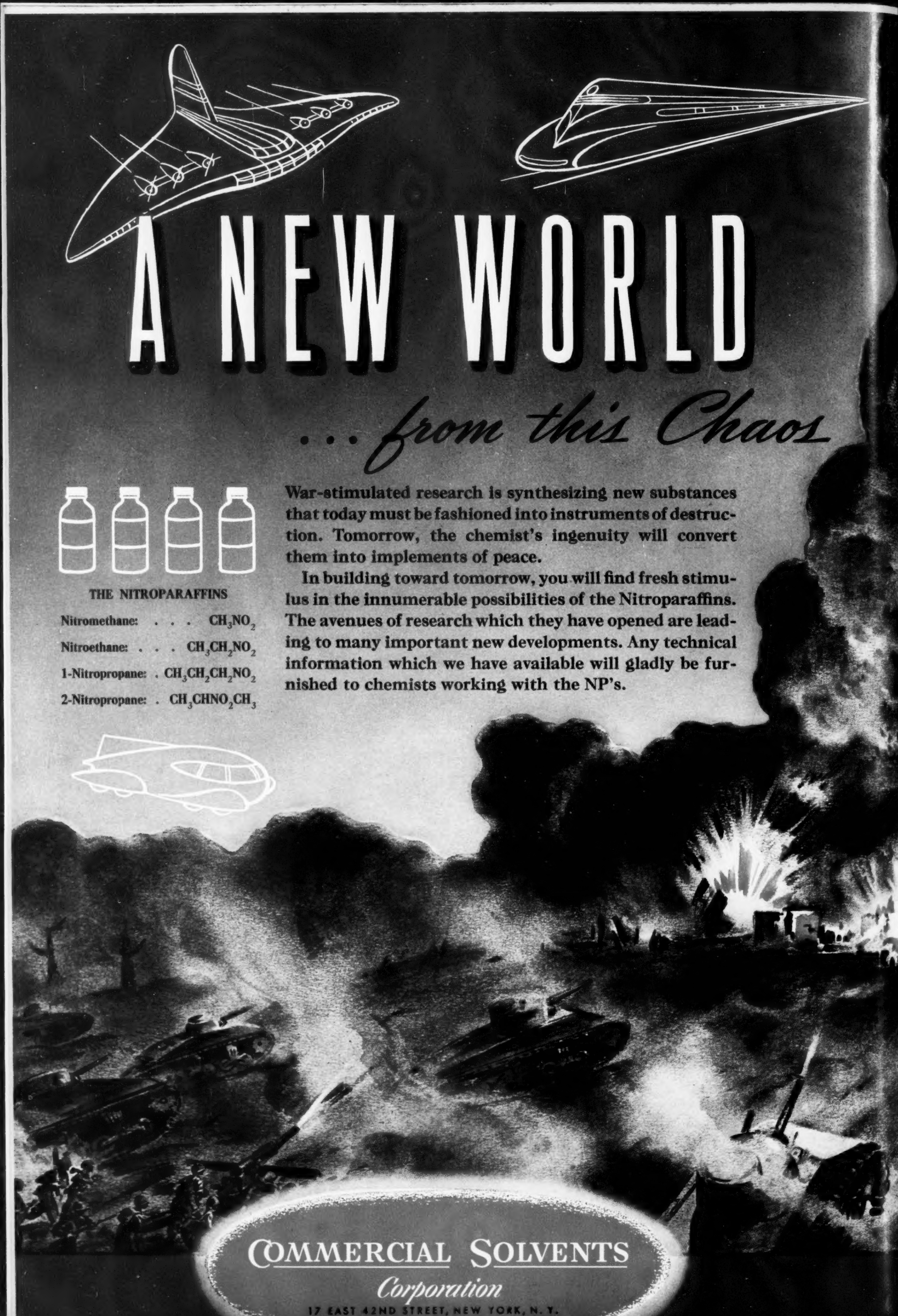
A NEW WORLD
... from this Chaos
War-stimulated research is synthesizing new substances that today must be fashioned into instruments of destruction. Tomorrow, the chemist's ingenuity will convert them into implements of peace.
In building toward tomorrow, you will find fresh stimulus in the innumerable possibilities of the Nitroparaffins. The avenues of research which they have opened are leading to many important new developments. Any technical information which we have available will gladly be furnished to chemists working with the NP's.
THE NITROPARAFFINS
Nitromethane: . . . CH_3NO_2
Nitroethane: . . . $CH_3CH_2NO_2$
1-Nitropropane: . $CH_3CH_2CH_2NO_2$
2-Nitropropane: . $CH_3CHNO_2CH_3$
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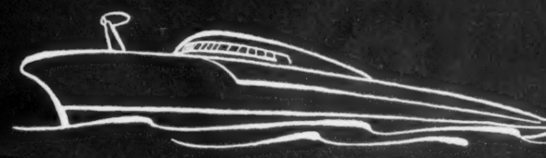


THESE TYPICAL REACTIONS *illustrate a few of the many possibilities of the Nitroparaffins...*

to ingenious chemists they may suggest the first step toward a highly desired synthesis:

Alkylhydroxylamines are formed by mild reduction of primary Nitroparaffins in the presence of zinc dust and water:

$$CH_3CH_2CH_2NO_2 + 4H \xrightarrow[H_2O]{zinc} CH_3CH_2CH_2NHOH + H_2O$$

Propylhydroxylamine

Dinitroneopentane is formed when 2 mols of Nitromethane react with one of Acetone:

$$2CH_3NO_2 + CH_3COCH_3 \xrightarrow{catalyst} CH_3C(CH_2NO_2)_2CH_3 + H_2O$$

Dinitroneopentane

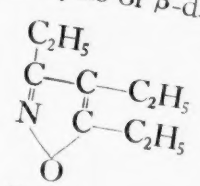
β-Dioximes result from condensation of 3 molecules of a primary Nitroparaffin in the presence of weak bases:

$$3CH_3CH_2CH_2NO_2 \longrightarrow CH_3CH_2C(=NOH)-CH(C_2H_5)-C(=NOH)CH_2CH_3 + H_2O + HNO_3$$

4-Ethyl-3, 5-heptanedione dioxime

Trialkylisoxazoles can be made by acid hydrolysis of β-dioximes:

$$CH_3CH_2C(=NOH)-CH(C_2H_5)-C(=NOH)CH_2CH_3 \xrightarrow[H_2O]{H_2SO_4}$$



$$+ NH_2OH$$

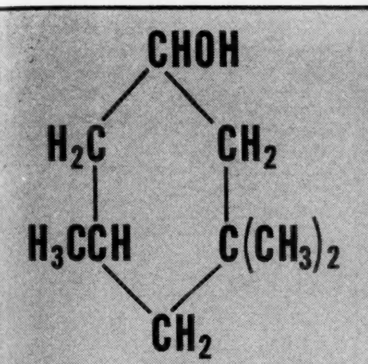
Triethylisoxazole

The versatility of the Nitroparaffins is indicated by the foregoing reactions taken from the technical and patent literature. For more complete information, write for copy of "The Nitroparaffins—New Worlds for Chemical Exploration."

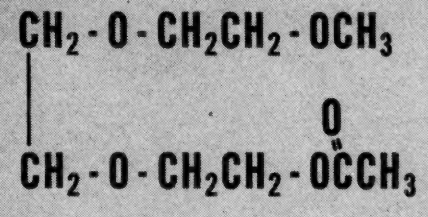
No. 8 in a series of advertisements about new research chemicals.

3 Reasons For Research

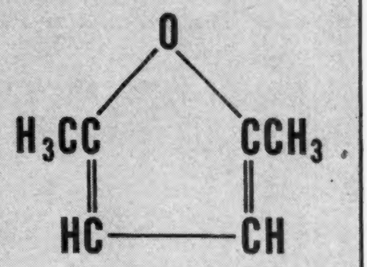
. . . unusual compounds from the laboratories
of Carbide and Carbon Chemicals Corporation.



TRIMETHYLCYCLOHEXANOL



METHOXYTRIGLYCOL ACETATE



DIMETHYLFURAN

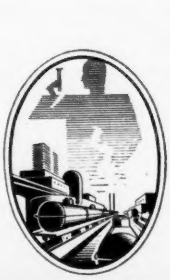
Trimethylcyclohexanol is a high-boiling (198°C. at 760 mm.) cyclic alcohol which is soluble in most organic solvents, hydrocarbons, and oils. Trimethylcyclohexanol is an excellent mutual solvent and coupling agent for many otherwise immiscible liquids. It should have value as an antifoaming agent, and in the manufacture of hydraulic fluids and textile soaps. Other possible applications for the compound include the preparation of plasticizers, xanthates, and wetting agents.

Methoxytriglycol Acetate is a colorless, high boiling (137°C. at 6 mm.) liquid distinguished by low volatility and excellent solvent powers for cellulose esters and synthetic resins. It is probably useful in protective coatings and printing inks having a cellulose ester base. The absence of reactive groups and its non-hygroscopicity suggest its trial as an inert reaction medium and as an "anti-dusting" agent for finely powdered materials.

Dimethylfuran is a water-insoluble liquid which boils at 93°C. It shows promise as a tanning agent, as a diluent for nitrocellulose formulations, and as a solvent for polyvinyl acetate. It has value as a chemical intermediate and readily reacts with maleic anhydride in the Diels-Alder reaction to form an anhydride with possible alkyd resin applications. Its specific gravity is 0.9018.

Although these new aliphatic chemicals are available now only in research quantities for laboratory investigation, it is probable that commercial quantities could be made for uses that will help win the war.

Reprints of the previous advertisements in this series announcing more than 30 other research chemicals are available on request. Write for them—there is no obligation.



For information concerning the use of these chemicals, address:

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

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PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

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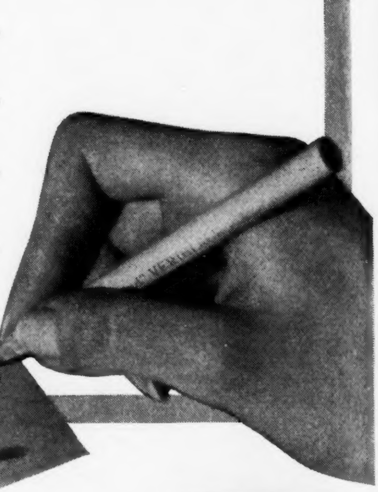
But no change in the service to our customers. For several years Wilson & Bennett Manufacturing Company has been operated as a subsidiary of the Inland Steel Company under the management of H. Denbigh Ellis, president. Now the new name, Inland Steel-Container Company, further identifies this company with its parent organization. It symbolizes continued progress in the development of still better containers for our customers' products.



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Steri-Seald
LINED STEEL CONTAINERS

Formerly WILSON & BENNETT MANUFACTURING COMPANY

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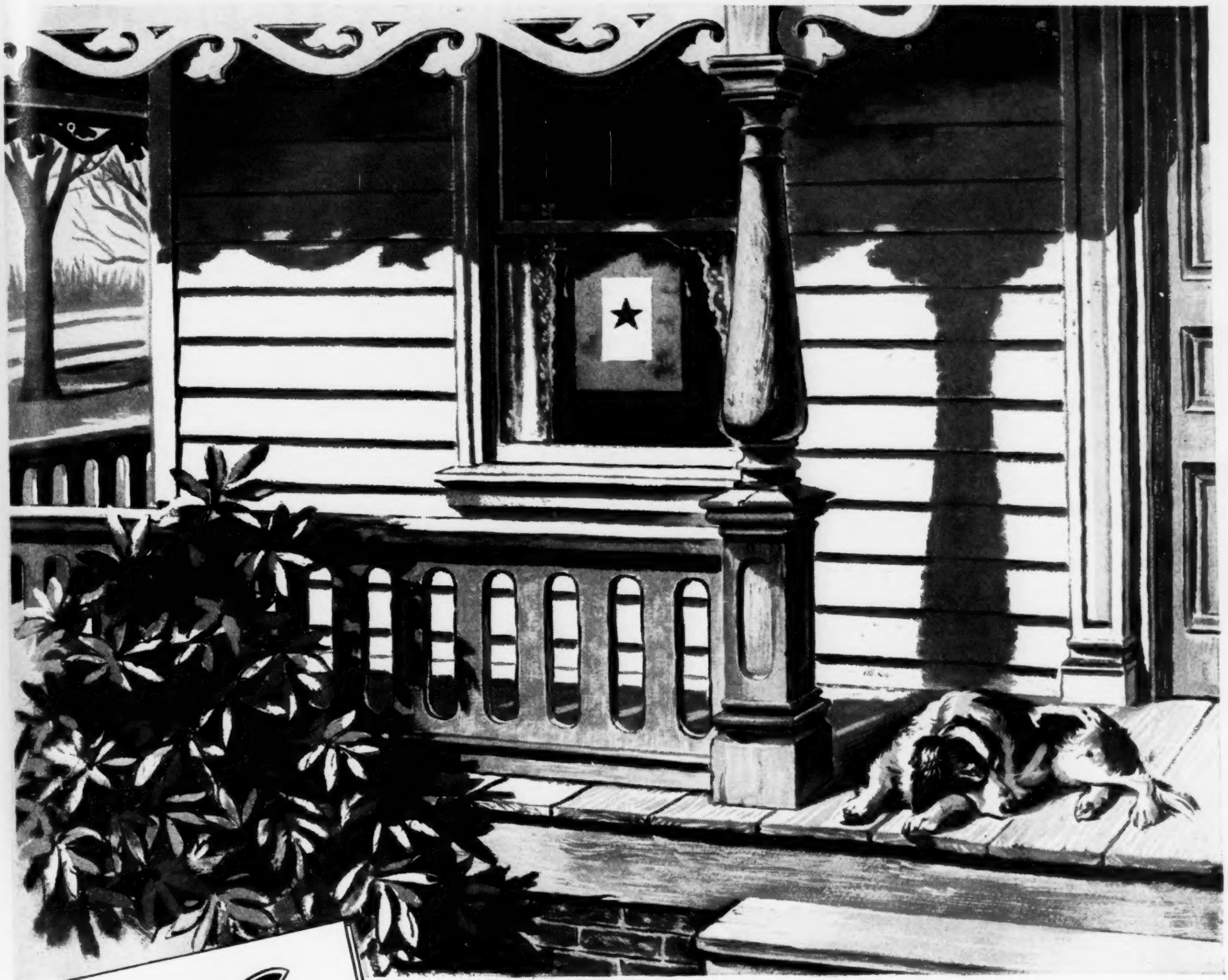

THE MAN WHO WAS UNABLE TO ATTEND . . . .

A fine new flag now flies over the Barrett Frankford Chemicals plant.

It is the Army-Navy "E" flag, awarded to the men and women in that plant for excellence in the production of war materials.

Their achievement was inspired by a man who wasn't able to be present when this flag was received.

He was in a fox-hole in Guadalcanal. He was driving a tank in Africa. He was in a crow's nest off Murmansk—in the top-turret of a Flying Fortress high over Essen. . . . He was a long, hard way from home.

It's because of the selfless job this man is doing that the job we're doing has been done to the best of our ability. For the chemicals that we manufacture are actually vital to his life. Chemicals for TNT and smokeless powder . . . for ship, tank and Army truck finishes . . . for lubricating oils . . . for plastics, and for extending our limited rubber supplies . . . for life-saving sulfa drugs, vitamins and other pharmaceuticals . . . for countless products and processes in literally every industry essential to winning the war.

That is a job worth doing right, and on his account we're very proud of this fine new flag and the honor it brings to the men and women of the Barrett Frankford plant.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

BARRETT COAL-TAR CHEMICALS: Tar Acids: Phenols, Cresols, Cresylic Acids • Naphthalene • Phthalic Anhydride Cumar* (Paracoumarone-Indene Resin) • Rubber Compounding Materials • Bardol* • Barretan* • Pickling Inhibitors Benzol • Toluol • Xylol • Solvent Naphtha • Hi-Flash Solvent • Hydrogenated Coal-Tar Chemicals • Flotation Agents Tar Distillates • Anhydrous Ammonia • Sulphate of Ammonia • Arcadian*, the *American* Nitrate of Soda

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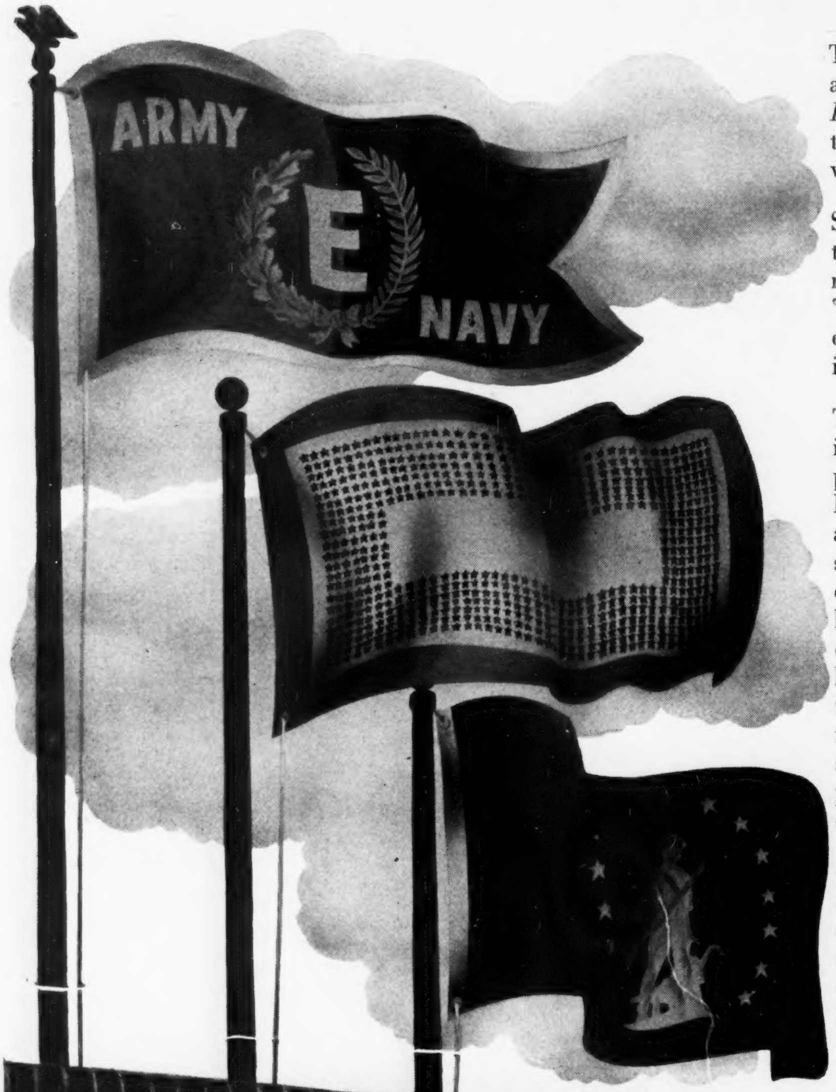
"AN OUTSTANDING CONTRIBUTION TO VICTORY"



The men and women of Merck & Co., Inc. are proud to announce that *The Army-Navy Production Award* has been conferred upon them for "great work in the production of war equipment."

Symbolic of distinguished service to America, the Army-Navy "E" Flag now flies above our main Plant at Rahway, New Jersey, and the "E" Pin has been presented to all our workers as evidence of the fact that they are making "an outstanding contribution to Victory."

The production of essential drugs and chemicals for America's Armed Forces and civilian population, and for those of the United Nations, demands the utmost in care, skill, accuracy, and craftsmanship. Scientific research, rigid analytical control, and greatly expanded manufacturing facilities—combined with *esprit de corps* and thorough co-operation between labor and management—have made it possible for us not only to meet the increasing demands of our Government for millions of finished products, but to supply the basic chemicals necessary for production by hundreds of other concerns in every branch of industry.

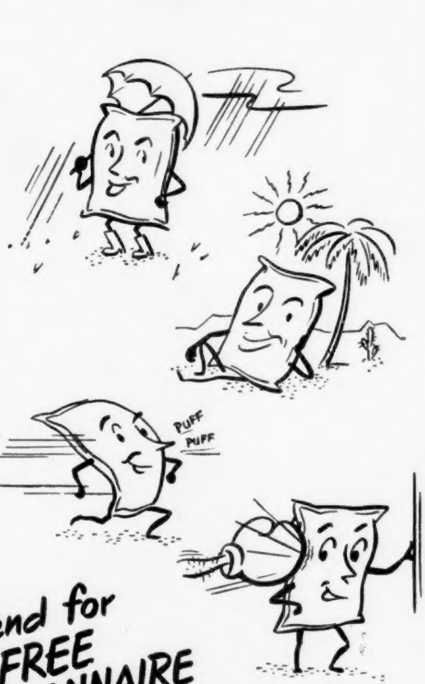
In accepting the award conferred upon us, we have joined together in assuring the officials of our Army and Navy that we will not relax our efforts, and that they can count on us for continued all-out production until this war is won.

MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

★ ***Fine Chemicals for the Professions and Industry Since 1818*** ★

BAGS FOR CHEMICALS!

If you have been affected by WPB Order L-197, chances are your chemicals can be practically and economically shipped in a CHASE Chemical Bag. The Chase Bag Company—specialists in bag packaging for over 95 years—has already *tested and qualified* bags for many chemicals requiring highly exacting shipping conditions.



Bags that keep Moisture Out

Chase supplies plain or highly specialized combinations of fabrics, papers and mastic compounds to resist spoilage from a wide variety of external conditions.

Bags that keep Moisture In

Other bags are made to retain essential moisture contents under trying conditions.

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Or, if your product demands air circulation, Chase has bags that permit free ventilation.

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Chase makes bags light in weight or sturdy enough to hold cast iron parts. Combinations of various qualities are available for your product.

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Mail the coupon at the bottom for free Analytical Questionnaire that helps our research specialists solve your specific problem. No obligation, of course.

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ST. LOUIS	NEW ORLEANS	OKLAHOMA CITY
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FOR YOUR LABORATORY TESTS AND EXPERIMENTS

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FOR YOUR PRODUCTION

New production materials, new processes and new techniques call for new chemicals, too. Throughout the past 50 years, Harshaw has done more than to meet industry's regular demands for chemicals. Continuous research and development have frequently resulted in our being ready to supply many of the newer chemicals which, today, are proving so vital to war production. For instance, we have been one of the leaders in pioneering new catalysts used in isomerization, dehydrogenation, polymerization, alkylation and hydrogenation reactions.

Wherever YOU may use chemicals—in the plant, or in the laboratory—standardize on Harshaw all the way. You can be sure they will conform to the same uniformly high standards so many industries have learned to expect of us.

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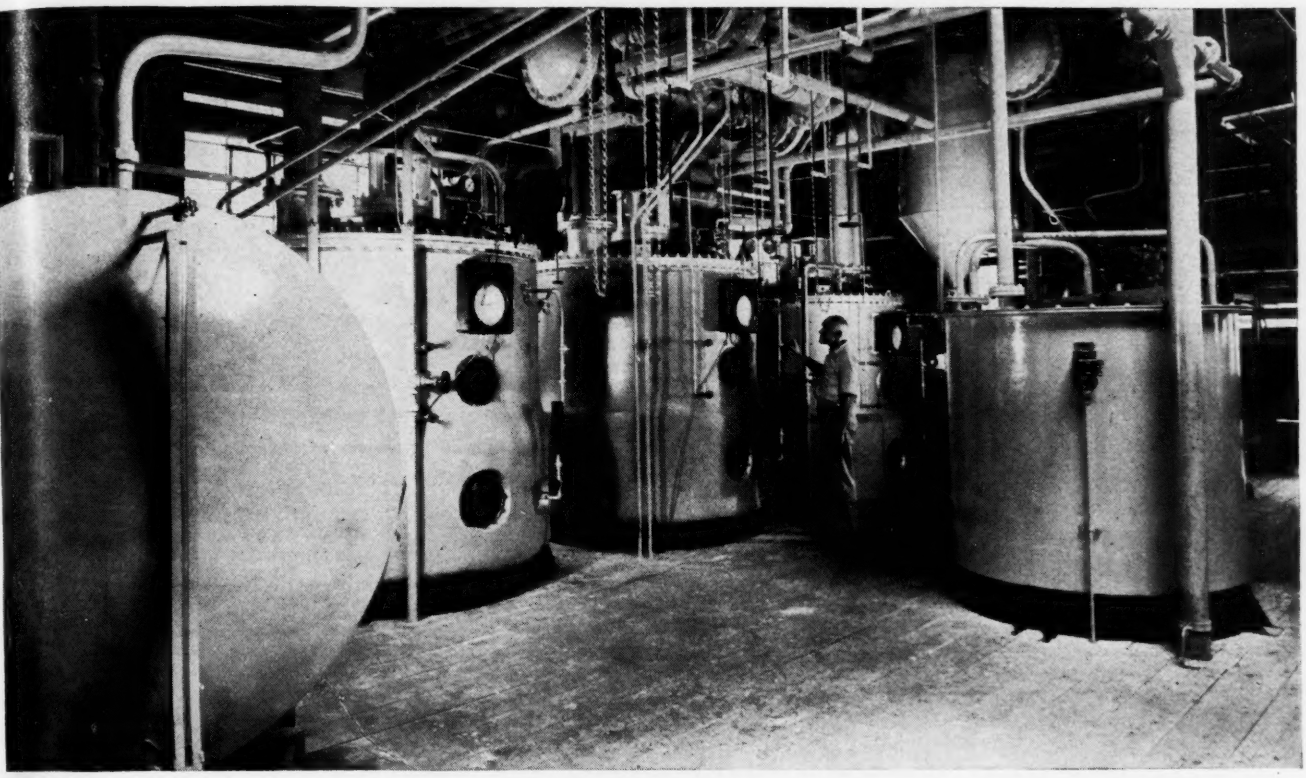
The Harshaw Chemical Co.

1945 E. 97th Street Cleveland, Ohio



Industrial Products by Fermentation Processes

• Noah has received credit for one of the earliest recorded chemical discoveries. He found that under some conditions grape juice underwent a change and the resulting product, when imbibed, produced a pleasant physiological effect entirely different from that which the original juice gave. Unfortunately, as a result of continuing his testing "not wisely but too well", he has received some undesirable notoriety.

It was also observed at an early date that sometimes fruit juices underwent another type of change which resulted in the development of sourness. Milk was also found to become sour on storage. Since the resulting products found practical use, empirical methods of regulating these alterations were developed.

Not until the investigation of Pasteur was it recognized that these changes were due to the growth of various microscopic organisms. It had been noticed earlier, however, that the development of visible organisms, termed molds, also resulted in changes of the medium on which they grew.

Since Pasteur a large number of experimenters have developed methods not only of preventing, but also of encouraging the growth of these organisms, both visible and microscopic. Others have studied the chemical changes brought about by them. It is now recognized that these reactions are similar to, or in many cases the same as, those occurring during the development of a fruit or vegetable and are natural vegetative processes.

As a result of some of these researches a considerable variety of products of industrial importance is now being manufactured by the careful cultivation of a number of these organisms. Since this is a comparatively new field, it can safely be assumed that with time the number of compounds produced by such methods will be greatly enlarged. The probability of this is increased by the fact that the raw materials for such processes are generally of American agricultural origin, thus removing any dependence on foreign products.

Chas. Pfizer & Co., Inc. has been one of the leaders in this field and is at present producing Citric Acid, Gluconic Acid, Fumaric Acid, and Oxalic Acid by such methods. From these acids a wide variety of derivatives is being manufactured. A well-trained research staff is engaged in the improvement of present processes and in the development of new products. Results in many of these latter investigations indicate that products of possible importance in a variety of fields will in time be made available.

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ZIRCONIUM
in industry
Today, War and non-war manufacturing has emphasized the ever-increasing uses and possibilities of the element ZIRCONIUM and its compounds in industry. TAMCO Zirconium compounds are being used successfully in the manufacture of Refractories, Electrical Resistors, Resins, Dye Extenders, Water Repellents, Catalysts, Abrasives, and Ceramics.
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Boom in war babies!

AMERICA'S industrial birth rate is zooming, too. Spurred by war, such wonder children as synthetic rubber, plastics, dehydrated foods, air freighters, have emerged from blueprints and test tubes to reality.

The influence of victory's offspring is far reaching, fast growing. It means new methods and new processes in many different fields. To manufacturers meeting these changes, the technical assistance of the Wyandotte Chemicals Corporation can be of great value.

Wyandotte men are working with more than fifty different industries —expediting the handling of alkalies in textiles, caustic in explosives, chlorine in plastics. They are abreast of developments which . . . once seemingly remote . . . may now have a direct bearing on the "duration" uses and post-war prospects of your own products.

Whether your product is a "war baby" or is long established, the broad experience and research background of Wyandotte experts are freely offered. There is no obligation for their assistance.

• Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

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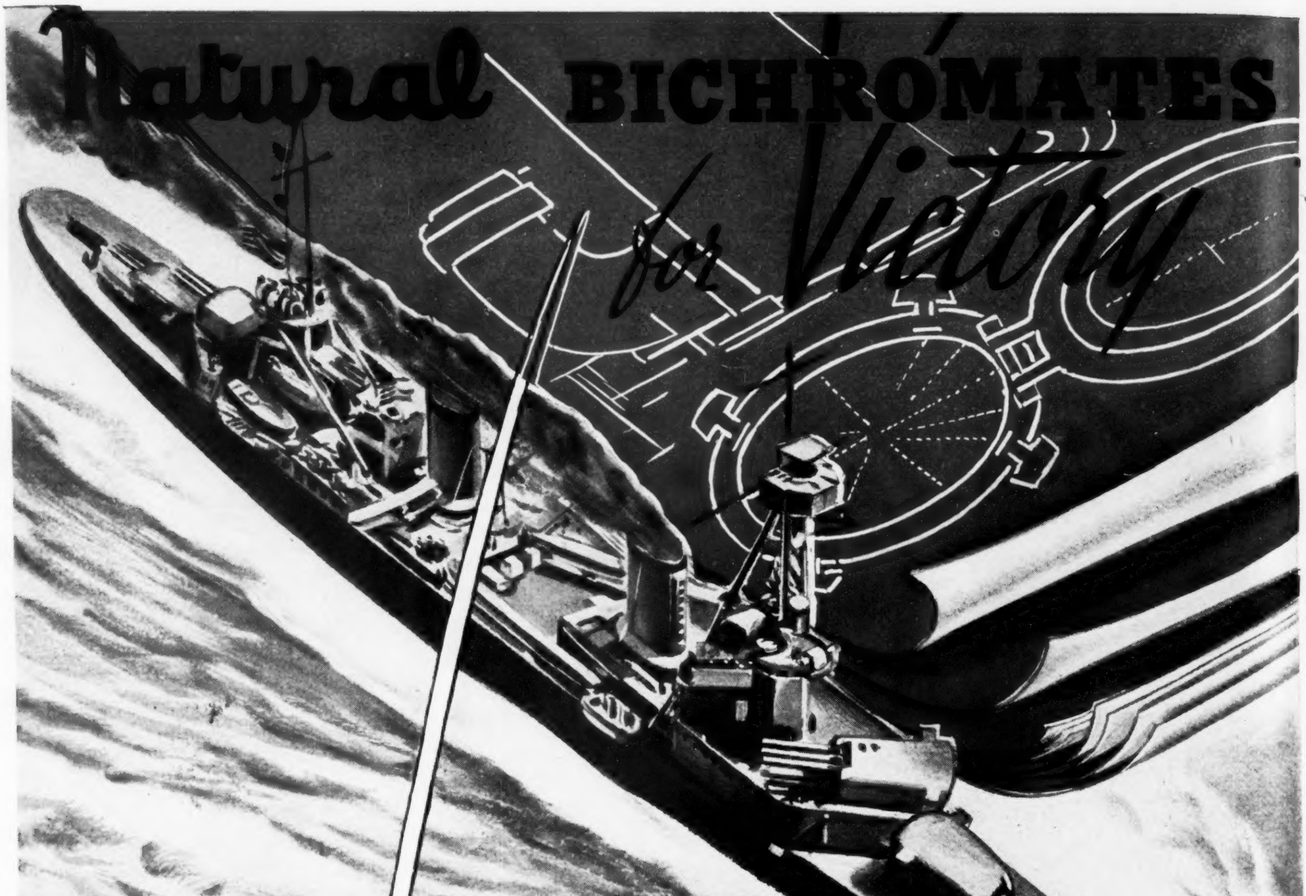
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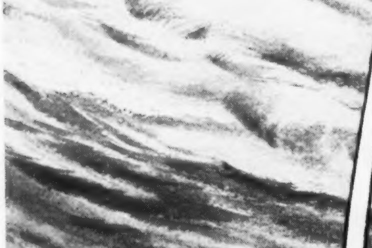
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Looking at the New Kilgore Bill

EDITORIAL

Robert L. Taylor, Editor

The revised bill on mobilization of research introduced in the Congress last month by Senator Kilgore and referred to the Committee on Military Affairs is in principle little different from its predecessor of last August. It still provides for virtually complete government control over all scientific research facilities and personnel, technical information, patents and licensing. It would establish a central Federal administrative agency to be known as the Office of Scientific and Technical Mobilization which would serve as a gigantic director of research for the nation.

Both the original and revised bills have naturally come in for much discussion throughout the chemical industry. Most such discussion has been negative, with reasons varying from fear of "socialization" of research to the conviction that all that is possible is already being accomplished.

To us it seems that the whole thing boils down largely to a question of whether setting up another government agency to run the scientific research effort of the country is going to help or hinder a quick winning of the war. We don't think it will help.

We doubt if Senator Kilgore actually intends his bill to be a step toward the socialization of industry, but the point is we don't believe that is the important consideration now anyway, regardless of what post-war implications it may have. We believe very emphatically—and with all due regard for our own and others' well founded concern for the freedom of free enterprise after the war—that it is our duty and all industry's duty to evaluate these things as they come out of Washington or elsewhere, on the basis of their contribution to a quick and smashing victory over the enemy. The objection to the Kilgore Bill should not be that it would socialize research, but that it would hinder the war effort. Short-sighted at the very best is the viewpoint of those who say we are winning the war anyway so why submit to "socialization" and run the risk of permanent loss of private rights. The we're winning-anyway philosophy has never won much.

Briefly, we believe passage of the Kilgore Bill would hinder the war effort in two ways:

First, it cuts across functions already being performed by the WPB through its Office of Production Research and Development and by the OEM through its Office of Scientific Research and Development. Both of these agencies are working closely with private industry and private research organizations, and any change as sweeping as that provided for by Senator Kilgore could not help but cause some disruption and slowing down of accomplishment. Whether the loss could be overcome in the long run is pretty much beside the point at this stage of the game.

Second, it is highly questionable if government control of research could better the overall results now being achieved, even after allowing for an adjustment period. The nation's research facilities are already at the disposal of the government and are performing noteworthy service. Knowledge and data are being pooled through industry groups and trade and professional associations. Obviously there is a point at which limitations and red tape imposed by centralized control cancel out whatever gains there may be in the way of better coordination and direction of effort.

Thus it seems to us that the Kilgore Bill, or any other bill calling at this time for fundamental changes in the organization and administration of research, cannot result in speedier victory. In fact it would have a retarding effect on the overall contributions of research to the war effort and should be stoutly opposed on those grounds.

Over One Hump? The war is not won by a long shot, but it does appear that the country's war production peak in most industrial fields, including chemicals, has been reached.

Aside from the usual indices of production, such as carloadings and electrical output, there are other more fundamental trend-making rather than trend-indicating factors which point toward a flattening out or possible slight downward course in total output of the industry. For instance:

New construction of chemical plants is tapering off.

Washington emphasis is being shifted from production to movement—movement to the fighting fronts. This means ship and aircraft construction will continue to new peaks, but chemicals thus consumed will likely be offset by a dropping back in other branches of war production and further contraction in civilian goods.

Industrial manpower is probably at its peak. Industry in general will feel the real pinch soon as the full demands of an 11,000,000 man Army and Navy are brought to bear.

Doubtless typical of what may be expected consumptionwise is the recent announcement by the Army and Navy that one large chemical user, the textile industry, has "in general achieved the maximum rate of production on military fabrics that it is likely to be called upon to provide in 1943." In fact, "it is possible that military requirements of certain fabrics might be slightly reduced this year."

It would seem from all this that chemical manufacturers' big problem will not much longer be to squeeze the last ounce of product out of the last available teakettle. More likely it will be how to keep required production going with available brawn and brainpower.

"It is With Regret..." So begins the 41st Annual Report to Stockholders of Monsanto Chemical Company. No, the company didn't show a loss for the year. The thing of regret is that President Edgar M. Queeny has felt obliged to throw overboard the fruits of a number of years of pioneering and progress by his company in developing truly informative and interpretive reports to stockholders.

Contrasted with former Monsanto reports, which have been above average in letting the stockholders in on the workings, plans and prospects of the company, the present one looks like a financial anatomy class skeleton. The reasons, says Mr. Queeny, are war censorship and the new proxy provisions prescribed by the Securities and Exchange Commission. The latter is something "to which we yield with reluctance. We have been advised that these new rules make an annual report a part of the proxy soliciting material. Therefore, they may have the result of imposing severe limitations upon the directors and officers and company in the event of misstatement or omission of material fact. Honest expressions or interpretation of operations or prospects by company officials might in the light of subsequent events prove incorrect. Company officials cannot be infallible. Until the true import of these new regulations is established or clarified by subsequent modification or until they are withdrawn, no prudent course seems open other than limiting annual reports to terse statements of facts, verified at the time by independent auditors."

SEC has stated that it did not intend its order to have this effect, and it has ruled that annual reports to stockholders are not a part of the proxy statements unless the company specifically requests it. But the fact remains that here is at least one major company that has been influenced by the order to the extent of withholding from stockholders and the public all interpretation of its year's operations and developments.

The possibility of any such interpretation of the law being adopted generally is most certainly a matter to be viewed with regret. It doesn't take an oldster in the chemical industry to recall the time when bankers and the investing public in general turned up their noses at upstart young chemical companies that cooked up evil-smelling messes in apparatus that did sometimes look like it had been thrown together from a junk pile. Only too well do some of our leading chemical companies today remember the time when a little confidence on the part of investors might have gone a long way toward hastening the growth of what was destined to become a great industry.

Chemical industry now, even though much further in its development, still needs venture capital. It still needs the confidence and good will—and pride of ownership—of the stockholders in the individual companies comprising it. The interpretive financial report has been these companies' primary means of talking to their stockholders, and of sharing with them their honest and considered views on the prospects of the business. They certainly have not abused the privilege. If it is taken away the consequences may be much more far-reaching than can now be foreseen.

Drums Again! The urgency and importance of emptying and returning steel drums immediately after they have served their function as transport containers cannot be overemphasized. Despite repeated pleas by chemical manufacturers via letters, posters and advertising, some consignees still do not seem to take the matter seriously.

The industry has been told that regardless of essentiality, steel for drums is definitely limited. And as Hercules Powder says on one of its plant posters, "You can't ship liquids in a paper bag."

Every user of chemicals must consider it a practical necessity as well as a patriotic obligation to keep a constant check on the flow of drums through his plant. It should be made definite to all employees that drums, and in fact all returnable containers, are to be handled carefully and speedily and under no circumstances are to be used for purposes other than those originally intended. A little more direct interest and action on the part of plant production officials should help the situation.

Rapid training of new employees in the chemical industry is a problem because of the specialized nature of individual tasks and because of the varied combinations of such tasks frequently required of one employee. Mr. von Pechmann tells how Agfa Ansco has successfully applied certain mass teaching techniques to speed up individual training.

New employees are made familiar with the product and the principles of its manufacture.

An Employee Training Program For Chemical Manufacturers

By **Walter von Pechmann**

Agfa Ansco Division of General Aniline and Film Corporation

WHEN we first began to revise our employee training system, it seemed impossible to accept the recommended mass training program of the War Production Board, since our workmen, due to the nature of our product, have to be trained more or less individually. However, realizing the basic value of this program, we felt it was up to us to make any necessary modifications rather than to claim that the War Production Board suggestions had no place in so highly a specialized industry as ours.

Supervisors and foremen in various departments were asked why they were not willing to accept the War Production Board program. The replies may be of value to anyone who must overcome the resentment which occasionally prevails in a chemical industry toward a systematic employee training program. Here are typical answers:

1. Because assignments of our operators are manifold, overlapping, and irregular, it is difficult to break their jobs down into steps.
2. The training program suggested is based on a complete standardization of production procedures. Because of frequent changes in our formulas, we cannot standardize our production.
3. Even if we could standardize our production completely, "experience" is necessary to know what to do in case variations take place. "Experience" cannot be taught.
4. The training program provides that foremen teach beginners. Our supervision is too busy, and cannot spend sufficient time to break in workmen.
5. To minimize the damage to our product, we have to assign new operators to experienced workmen until they know their job. Old employees are the logical teachers since they are with the beginner all day and often know more about a job than the foremen do.
6. The industrial training program is of value only if many workmen can be trained simultaneously. The majority of our workmen have to be trained individually.
7. The training method suggested provides that employees be taught on the job with machinery used in production and that every step should be repeated until known to the employee. This cannot be done for reasons as follows:
   a. Unfavorable conditions such as noise, frequent interruptions, insufficient illumination, make teaching on the job by an instructor impractical.
   b. Our production machinery is taxed to the limit; we are unable to set aside equipment to train employees.
   c. Training beginners during production according to the method suggested cannot be done since our operators have to perform a large variety of tasks which in many cases take place only once a day or once a week. It is not possible to hold up production in order to repeat a task.

Taking the above arguments into consideration, we come to the following conclusions:

1. Though it is very difficult to establish a completed job breakdown of a chemical workman who has to perform during his working day sometimes as many as ten different jobs unrelated to each other, it is well worth trying.
2. Complete standardization of production procedures in our industry is difficult but does not seem impossible.
3. "Experience" necessary to perform an operation is usually over-emphasized. If production procedures can be standardized and instructions are issued how to perform work in case variations take place, usually not much is left to "experience."

4. Because of the fact that our foremen are greatly overburdened with work, it does not seem advisable to assign to them the training of new employees; this applies especially in departments where there is a variety of jobs. It seems that someone besides the foremen should be assigned to the teaching of employees.

5. It does not seem advisable to let one workman teach another for reasons as follows:

a. To put into operation successfully the industrial training program one must adhere to the principle—"tell, show, illustrate, and question." It is impossible to make all expert operators good instructors.

b. Our experienced operators are often unable to express themselves properly, or they confuse the beginner by "showing off," thereby making the job more difficult than it really is.

6. The statement that a training program should provide for the teaching of a number of employees simultaneously is based on the assumption that the cost of training employees individually is too great. However, if we are able to keep the cost of training one employee sufficiently low, there is no reason why we should not teach our beginners individually.

7. It is agreed that we cannot always train our employees on the job if we have to follow the principle of "tell, show, illustrate, and question." Some way must be found to teach employees away from production.

It is evident that considerable difficulties would have to be overcome if we ever should be able to put into effect an efficient employee's training program. It seemed, however, worth a trial. We therefore rolled up our sleeves and went to work. First, we laid the foundation to make this training program possible.

Preliminary Steps

Job Break Down Charts—Going over our old instruction books, we found that only the most important phases of every job had been covered; furthermore, only in a very few cases had we specified in what manner a job was to be performed. We therefore discarded our instruction books and started to draw up operation charts. Meetings were held, attended by the Supervisors, a Group Leader, and a workman familiar with the job to be analyzed.

It seemed logical to make out several charts for one man's work. However, this would defy the purpose of a job break down, since the separated charts could not show the order in which the steps have to be performed. We finally decided to list all the activities of a workman on one chart, separating his different jobs by placing all steps belonging to a certain task under each other.

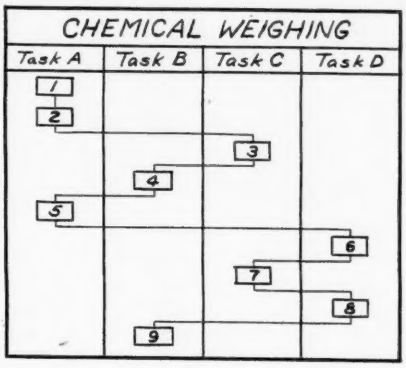


Figure 1

This job breakdown has the advantage that the beginner can be shown that his assignment consists of several tasks which are taught individually. At the same time, the pupil will learn in which sequence he has to switch back and forth.

New Instructions Issued—Corresponding with every step marked on the break down chart, instructions were issued which described in detail how every step had to be performed. Our operators now have to read a number of instructions daily, and our group leaders and supervisors check daily to see whether the work is performed according to standards. We had very few difficulties with this switch over, with the exception that we found that our old, experienced operators occasionally took "short cuts." However, they cooperated with us to the fullest extent after we explained that for the sake of unity it would be necessary for them to perform their jobs according to our standards. The fact that we had always called one of our key operators to the meetings where the standards were established helped a great deal since he is naturally interested in putting into operation the changes which were approved by him.

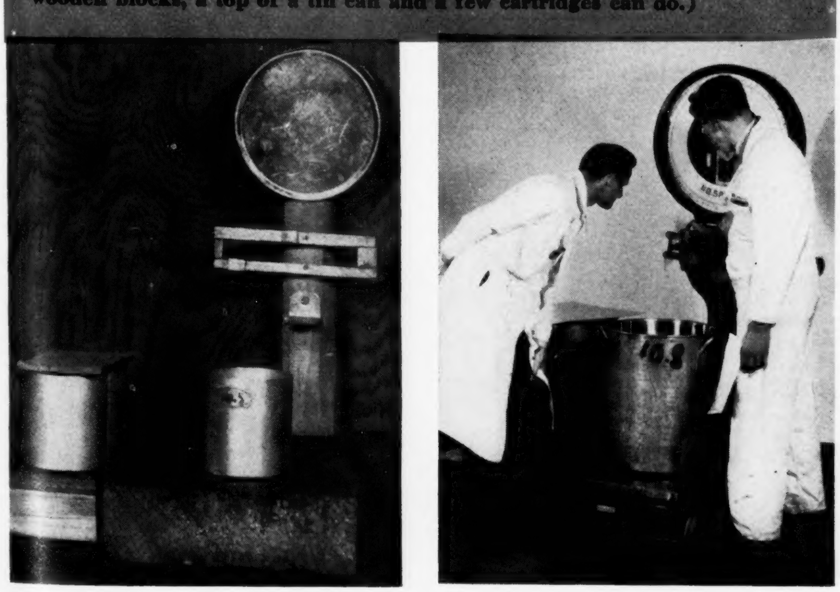
Development of Training Program

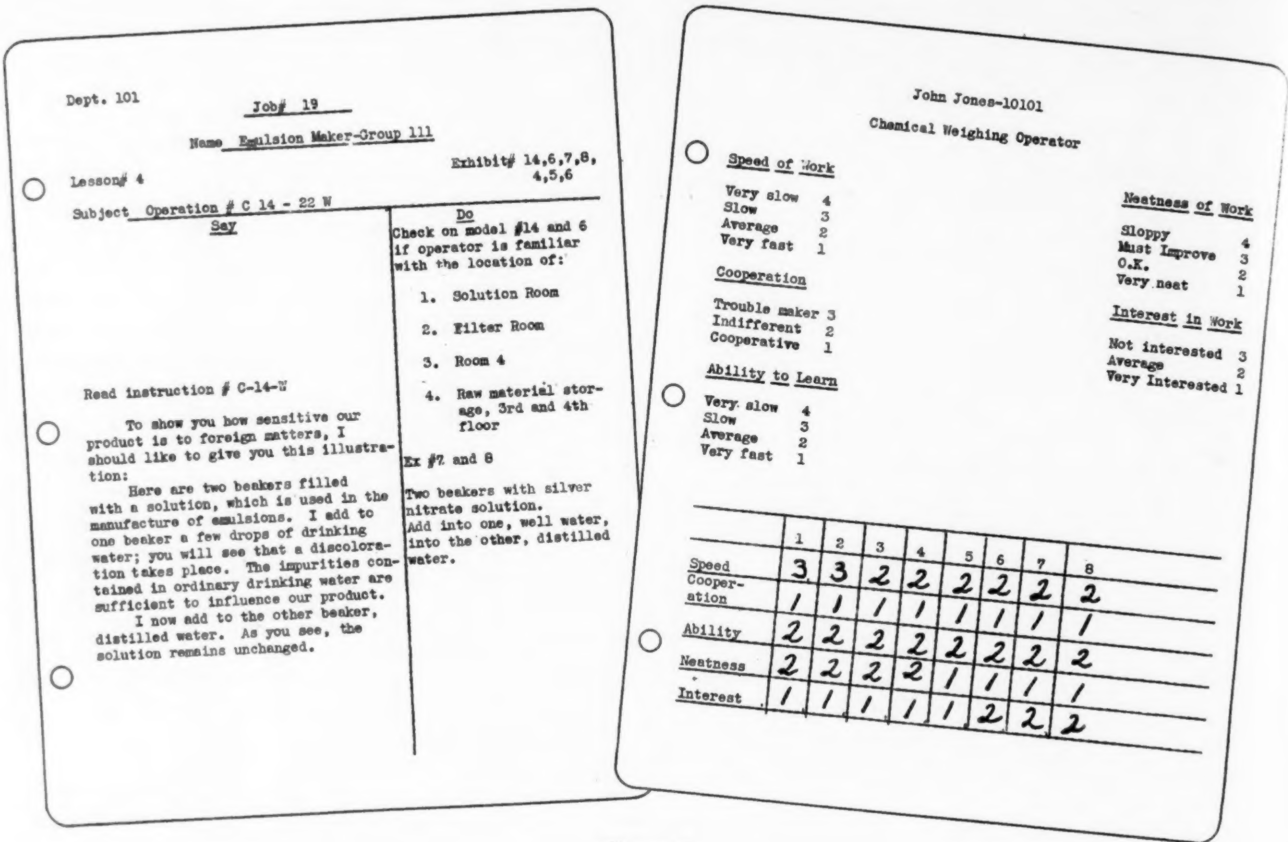
Since we decided that neither our supervision nor our experienced workmen should be assigned to the instruction of beginners, we selected a group leader familiar with all operations and made him a full time instructor. He was supplied with the newly established job breakdown charts and corresponding instruction books. Beginners were first shown the entire department and then assigned to an experienced operator until they were able to handle the entire job alone. When starting, the new operators were told not to perform any operations until told to do so by the instructor. In the absence of the instructor, the new operators were told to observe the work done by the experienced operator.

The instructor made his daily round through the department and spent approximately an equal part of his time with each new employee. Telling, showing, illustrating, and questioning, he made the beginner familiar with a pre-scheduled number of steps according to our charts and instructions. He told the new operator to perform from then on under the guidance of the experienced operator, the operations just taught. The following day more steps were added until the workman was finally able to perform the entire job.

This method was found to have several disadvantages. The instructor was often unable to schedule his time so that steps he wanted to teach took place in production when he was present. Furthermore, new operators were often unable to perform the operations in the presence of the instructor, since very often a per-

Six-inch model at left replaces six-foot scale at right. (Notice what a few wooden blocks, a top of a tin can and a few cartridges can do.)




Dept. 101 Job# 19

Name Emulsion Maker-Group 111

Lesson# 4 Exhibit# 14,6,7,8, 4,5,6

Subject Operation # C 14 - 22 W

Say	Do
	Check on model #14 and 6 if operator is familiar with the location of: 1. Solution Room 2. Filter Room 3. Room 4 4. Raw material storage, 3rd and 4th floor
Read instruction # C-14-W	
To show you how sensitive our product is to foreign matters, I should like to give you this illustration: Here are two beakers filled with a solution, which is used in the manufacture of emulsions. I add to one beaker a few drops of drinking water; you will see that a discoloration takes place. The impurities contained in ordinary drinking water are sufficient to influence our product. I now add to the other beaker, distilled water. As you see, the solution remains unchanged.	Ex #7 and 8 Two beakers with silver nitrate solution. Add into one, well water, into the other, distilled water.

John Jones-10101

Chemical Weighing Operator

Speed of Work
Very slow 4
Slow 3
Average 2
Very fast 1

Cooperation
Trouble maker 3
Indifferent 2
Cooperative 1

Ability to Learn
Very slow 4
Slow 3
Average 2
Very fast 1

Neatness of Work
Sloppy 4
Must Improve 3
O.K. 2
Very neat 1

Interest in Work
Not interested 3
Average 2
Very Interested 1

	1	2	3	4	5	6	7	8
Speed	3	3	2	2	2	2	2	2
Cooperation	1	1	1	1	1	1	1	1
Ability	2	2	2	2	2	2	2	2
Neatness	2	2	2	2	1	1	1	1
Interest	1	1	1	1	1	2	2	2

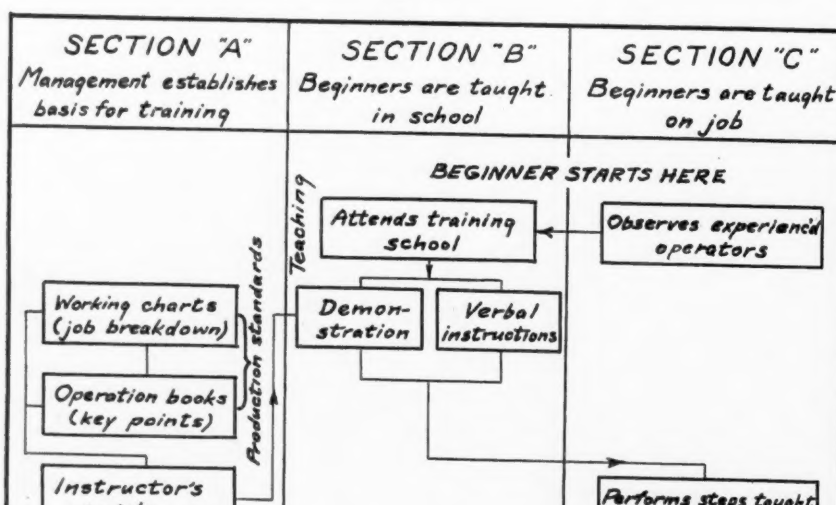
Figure 2

Left: Page from Instructors' Guide showing what to say and what to do for a typical classroom demonstration. **Right: Report record of trainee. Grades for the eight periods are keyed to the legend above.**

formance cannot be repeated in production without considerable time loss or danger to the product. To cope with this problem, we have built models which enable us to instruct an employee until he is able to perform the task.

To teach how to read a thermometer to the accuracy of 1/10 of 1 degree Centigrade may serve as an illustration:

Figure 3



Thermometer readings are taken approximately 10 times per day in production. The instructor was not able to schedule his time to always be present when the readings took place nor did it find our approval that he would assign someone else to teach the beginner. We overcame this situation by drawing on a large cardboard a facsimile of a thermometer (3 times normal size).

The instructor moved a pencil up and down the scale until he was satisfied that his pupil could read correctly. Then to make the beginner acquainted with the actual reading of temperatures, we built another model which consisted of a metal container into which a thermometer was inserted. The container was placed onto an electric heating plate. Supplied with a clock, the beginner was instructed to read the slowly rising temperature once every five minutes and to record his findings.

To reduce the time the instructor had to spend to supervise the beginner, we drew up a temperature chart with which the readings given by the pupil were later on compared and corrected. By this method, we were able to teach the reading of temperatures within four hours' time.

Expanding on our model teaching, we set aside a room for the sole purpose of teaching. There beginners are now taught

their future job step by step. The system works as follows:

Section A: Management Establishes Basis for Training—Consulting Fig. 3, one will see that our method of training is based on the belief that it is management's responsibility to establish the foundation for proper training of employees. This is done by putting in writing, the *where, when,* (working charts) and *how* (operation books) of performing an operation.*

To supplement this material we have prepared an Instructor's Guide in which the teaching of every job is divided into a series of lectures, each lecture being a unit in itself so designed as to be capable of assimilation by a beginner of average intelligence in a single session. We do not intend that the Guide and lectures should make an instructor a living phonograph record. We merely intend it to indicate the general manner in which we wish our instructions to be given. According to conditions, an instructor may repeat or elaborate. We feel that the Instructor's Guide has not only improved our way of teaching but also has made it possible to engage as instructors employees who otherwise would not qualify as teachers.

A sample lecture page from the Instructor's Guide is shown in Fig. 2.

Section B: Beginners Are Taught in School—This section consists of teaching and checking.

1. Teaching
   a. Verbal Instructions
      Instructions are given according to the Instructor's Guide.
   b. Demonstration

We consider model teaching especially adaptable for training workmen in the chemical industry for reasons as follows:

1. In contrast to workmen in other industries, chemical workmen perform their jobs on a considerable number of machines which spread over a wide area. If the workman is acquainted with his working surroundings, he can be much more quickly taught on a model of a floor layout.

2. Operators quite often cannot be taught in production rooms because of unfavorable conditions such as limited space and noise.

3. Since chemical workmen have to perform their operations on a variety of machines, it is not possible to set aside certain equipment on which to train employees, as is done in other industries.

4. On models, operations can be artificially speeded up by eliminating or reducing factors not essential to the training program.

5. Operations which consist of hard physical work can much more quickly be learned on models, for the beginner can perform the operation on a model without having to exert any physical effort.

6. Very often, the principles of machinery used in the chemical industry can be taught better on a model since it is possible to eliminate pipes and gadgets which often confuse the beginner. Furthermore, models can be taken apart to show the beginner "what makes it tick."

We have found it most practical and economical to make the models very simple. Since beginners spend only about 25% of their time in our training school (one hour in the morning and one hour in the afternoon) and the rest of the time in production, they become familiar very quickly with the machinery used. Therefore, a roughly shaped piece of wood representing a machine is often all that is needed for demonstration purposes.

Our workmen are getting quite a thrill out of moving and operating the models and tell us that this way of teaching is more instructive than learning their work during production hours on the actual machinery.

2. Checking

After the operator has been taught in school and has performed the steps taught under the guidance of an experienced operator in production, he is checked by the instructor on the job and in school before he is allowed to do the work alone. This is necessary since we have found that we cannot depend on the experienced operator to judge whether the new workman is able to perform an operation alone.

Section C: Beginners Are Taught on Job—On the job, beginners are taught by (1) observation, (2) job performance under supervision, and (3) job performance alone.

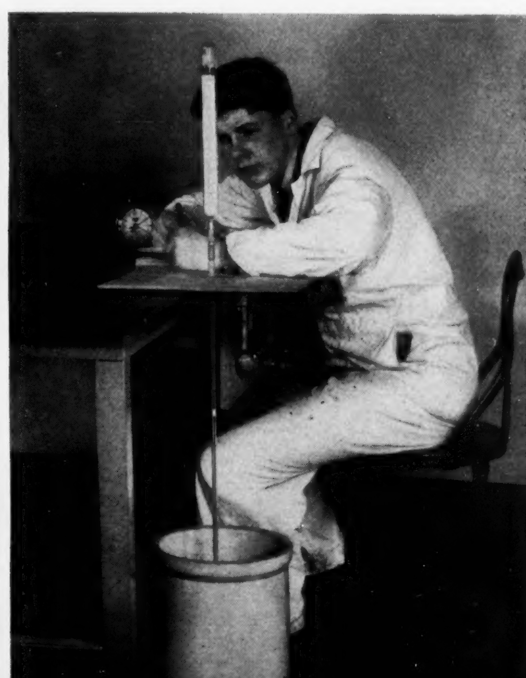
Since our new workers may perform part of their future job under supervision and part of it alone, we occasionally find it practical to assign the experienced operator to another job part of the time.

Conclusion

We find the above method of training new employees highly successful. Training time for our workmen has been reduced 50% on the average and in some instances 80%. We feel that our workmen are now trained more thoroughly than before, since they are equipped with more than the knowledge necessary to perform their specific jobs efficiently.

* It may be of interest to know that the working charts (job break down) and operation books in this manner serve a dual purpose:
a. To maintain production standards
b. To train new employees
This should do much to answer the argument that it is too expensive to spend so much time and money for "the sole purpose of training."

Right: New employee is taught how to read and record temperatures. Below: The decimal system used when weighing is explained to trainee.



AGRIPOL—

A Chemurgic Rubber

By Clinton A. Braidwood, Reichhold Chemicals, Inc.

AGRIPOL is the Reichhold Chemicals, Inc., trade name for a rubber-like polymer, a product capable of replacing rubber or reclaim for essential war or civilian use as approved by the War Production Board, comprising the reaction product of polyhydric alcohols with polymerized vegetable oil acids, or their derivatives, from which the monomeric acids have been substantially removed.

The product was first developed in the Northern Regional Laboratory of the United States Department of Agriculture, at Peoria, Illinois, under the name of Norepol. Credit is due Dr. R. H. Manley, Dr. J. C. Cowan, and H. T. Herrick for the initial research done on this material. The Reichhold Chemicals, Inc., laboratories took over the work after this basic research and improved the product to the extent that this chemurgic rubber is now in commercial production.

The original Norepol was first semi-compounded by adding soft blacks, sulfur, zinc oxide and accelerator. The ingredients were mixed then cured from 3 to 5 hours at 307° F. This was cooled then further compounded on mills. By this process it was impossible to obtain the optimum physical properties. Several months of further research by Reichhold's laboratory were necessary to bring the material to its present stage.

Properties

The Agripol polymer is a dark brown, viscous resinous mass. It is very sticky and almost impossible to handle in this physical state. The polymer, itself, is an unsaturated system; and its molecular weight depends a great deal on the treatment or synthesis during polymerization.

The Agripol polymer is difficultly soluble in aromatic solvents. It can be oxidized quite readily and responds to most rubber chemicals.

In the sticky-viscous form, the Agripol polymer is not feasible for rubber equipment such as milling, banbury, etc.; so it is necessary to take it to a stage in which it can be processed by the rubber compounders. This is accomplished by the addition of channel black, sulfur, zinc oxide and accelerators. The channel black is added to the polymer during the critical stages of polymerization. This lowers the temperature of the polymer to a point where it is safe to add the sulfur, zinc oxide and accelerators. Adding channel black to the polymer helps absorb most of the tack. The polymer then only requires a slight vulcanization or only a few sulfur cross-linkages to render it millable. This method of treatment is the most practicable, at the present time, in the production of large quantities of Agripol.

The best physical properties are obtained with uncompressed channel blacks. Mineral fillers such as Kalvan, Silene, Calene, Albacar, Titanox C, Kalite, magnesium carbonate, clay, ground marble, etc., either are not the right particle size, or are not properly wetted by the polymer to give it the proper reinforcing or semi-reinforcing properties.

One of the most difficult problems in producing a carbon black-free Agripol, besides tensile strength, was getting a durometer over 35. Certain types of mineral fillers normally give harder stocks than others, and some tensile strength, but their use in Agripol by themselves did not allow them to be taken from a mold.

It has been found recently that a combination of mineral pigments such as Kalvan, Titanox RC-C or M with Silene gave a stock which noted some promise of compounding in the proper direction; however, the compression set was poor.

Agripol is a trade name for a synthetic rubber-like product made essentially from polyhydric alcohols and polymerized vegetable oils. It was developed jointly by the Northern Regional Laboratory of the U. S. Department of Agriculture and Reichhold Chemicals, Inc. In this article our author, who has been intimately associated with this development, tells us about the material and its formulation into usable products.

We have information showing now that most mineral fillers greatly retard the cure in Agripol; therefore, it is necessary to add an additional 1% of mercaptobenzothiazole (Captax) and ½% of zinc diethyl-dithiocarbamate (zimate). This gave rather a flat curve, and a durometer of 60, cured 30 minutes at 297° F.

Optimum Formula

Experimental evidence has shown that 30 to 35 parts of channel black or 40 parts of precipitated calcium carbonate (Kalvan) on 100 parts of the polymer give the optimum or ideal master batches of Agripol. These are tack-free; can be safely handled on the mill; and, when broken down, have an excellent natural tack. The stock can be removed from the mill rolls with the same ease as natural rubber.

Agripol behaves as smoke sheet on the mill rolls, requiring less time than natural rubber to break down. Its natural tack gives it the property of bleeding together without laminating when properly processed. Agripol in its natural state is soluble in aromatic and certain aliphatic hydrocarbons, such as standard Solvent "R" (Standard Oil Co. of Indiana). After the Agripol has been slightly precured, it renders itself quite difficult to solvents. However, a semi-solution, or possibly an emulsion of the master batch, can be obtained by the material being well broken down on the mill in thin sheets, then being cut up in strips and immediately adding it to aromatic or aliphatic solvents.

Ozone and corona resistance of Agripol is excellent. Samples were tested for ozone resistance (without the addition of an anti-oxidant):

Green tensile—500 lbs./in.^{2}	115% elongation
16 hours in ozone	
Aged tensile—750 lbs./in.^{2}	100% elongation

There were no signs of cracking on the surface of the samples. This outstanding property should be of great interest to insulation manufacturers. The electrical physicals of the Agripol containing mineral fillers are excellent.

Agripol is flexible at —40° F. without any added plasticizer. Samples tested in a Geer oven for six weeks showed no signs of aging without any loss of green physicals.

Henry Reichhold, chairman of the board of Reichhold Chemicals, Inc., and Clinton Braidwood, our author, examine samples of Agripol.

Agripol compounds should be looked upon as master batches. Conventional rubber equipment can be used for the compounding of the material. It is milled on cold rolls at approximately 75° F. The fillers are added with the greatest advantage when it begins to smooth out on the mill rolls. Agripol is tubed best in a cold barrel and a hot die. It gives a very good calender or friction coat on fabric. The calender roll temperature is the same as on the mill rolls—possibly a few degrees warmer to eliminate crowfeet. Excellent spread costs can also be obtained with solutions of Agripol.

Compounded as Rubber

Agripol is compounded as rubber, using all of the known rubber chemicals.

It should be thought of as a master batch and handled or compounded as such. The following are the compounds marketed by Reichhold Chemicals, Inc., and their designated codes:

Agripol	P-345		P-360	
Polymer	100.0	parts	100.0	parts
Cabot #6 or #9 Channel Black	32.0	"	....	"
Kalvan	....	"	40.0	"
Zinc Oxide	4.0	"	4.0	"
Sulfur	4.0	"	4.0	"
Captax	1.0	"	1.0	"

Since the polymer is very tacky, the fillers dry up or absorb much of the tack, but not enough to allow further compounding on the mill at this stage. The sulfur, zinc oxide and Captax are added and the mixture is given a pre- or semi-cure. This slight cure dries the polymer to a point where it then can be further processed on mills or banburies. The degree to which the polymer is cured is controlled by the following: Plasticity, free sulfur, acetone extract, tensile and elongation.

Most of the difficulty encountered to date in compounding P-345 Agripol has come from the further addition of zinc oxide and sulfur.

Accelerators

Agripol P-345 and P-360 require only the addition of accelerators to obtain a good cure since the pre-cured master batches have used only a very small percentage of the sulfur, zinc oxide, mercaptobenzothiazole previously added.

The zinc oxide is present as a zinc salt of the residual fatty acids in the Agripol. This means that no fatty acids are required to promote the accelerator. The further addition of zinc oxide only forms soaps which result in very low tensile and elongation. When more sulfur is added, a bad sulfur bloom appears, and the stocks become very short and brittle.

There is also enough residual mercaptobenzothiazole so that .25 of a part of tetramethylthiuram monosulfide or disulfide, zinc or selenium dimethyl or diethyldithiocarbamate is all that is necessary to give a satisfactory cure, which is a flat curve, in 30 minutes at 297° F. with P-345.

Agripol P-360 requires somewhat different treatment of the accelerators than P-345. Mineral fillers greatly retard or block the cure in this material; so it is necessary to add up to one part of mercaptobenzothiazole or benzothiozoldisulfide in combination up to .5 parts of a zinc salt of dithiocarbamate or thiuram monsulfide or disulfide to obtain the best cures.

Tensile Strengths

The highest tensiles obtained with Agripol to date have been obtained by the use of medium hard and soft hard channel blacks. The tensile strength is dependent on high loadings of black. There seems to be a definite critical point on the tensile in the region of 60 parts of channel black on 100 parts of the polymer. The following compounds are an example:

	A	B	C	D
Agripol P-345 (Uncompressed Cabot #6)	140.0	140.0	140.0	140.0
Compressed Cabot #6	40.0	50.0	60.0	70.0
Tuads	0.25	0.25	0.25	0.25

Cured 30 minutes at 297° F.

	Durometer	Tensile lbs./in.²	Elongation %	Flexibility
A	80	425	75	+
B	85	475	70	+
C	88	550	65	+
D	90	720	60	+

The channel blacks added to these compounds were compressed. Higher loading of black gave stocks which, when bent back on themselves several times, cracked or broke.

Uncompressed channel blacks gave the highest tensile yet obtained. The following two compounds substantiate this statement:

	E	F
Agripol P-345 (Uncompressed Cabot #6)	140.0	140.0
Uncompressed Cabot #6	60.0	70.0
Tuads	0.25	0.25

Cured 30 minutes at 297° F.

	Durometer	Tensile lbs./in.²	Elongation %	Flexibility
E	88	1200	85	+
F	90	1275	75	+

Uncompressed Blacks Best

Uncompressed channel blacks, as shown by the data above, definitely give better reinforcing properties than compressed. This can possibly be explained by the fact that better dispersion is obtained by the uncompressed blacks, and that the compressed blacks or spheron blacks are not broken down enough by the shearing action of the mill. It can be noted here that all of the compounded stocks were passed through the mill twenty times after the blacks and accelerator were in. The Agripol soft polymer possibly protects the spheron of black from further breaking down and consequently dispersing.

Further investigation of the different effects of compressed and uncompressed blacks on Agripol are being carried on at the present time.

Several different makes of blacks were tested for reinforcing, and our primary work shows that the choice of blacks is very important in obtaining the maximum results. To clarify this statement the

following series using Kosmos 77 was run:

	1	2	3	4	5	6
P-345 (Kosmos 77)	140.0	140.0	140.0	140.0	140.0	140.0
Kosmos 77	....	10.0	20.0	30.0	40.0	50.0
Tuads	0.25	0.25	0.25	0.25	0.25	0.25

	7	8	9
P-345 (Kosmos 77)	140.0	140.0	140.0
Kosmos 77	60.0	70.0	80.0
Tuads	0.25	0.25	0.25

Cured 30 minutes at 297°F.

No.	Durometer	Tensile lbs./in.²	Elongation %	Flexibility
1	45	200	125	+
2	50	246	115	+
3	60	320	105	+
4	70	430	100	+
5	75	450	85	+
6	80	480	70	+
7	85	500	35	+ & —
8	88	520	30	—
9	90	480	30	—

(+) Stock could be bent back on itself without breaking or cracking.

(—) Stock cracked or broke when bent back on itself.

The above results fall in line with the general pattern of high loading of blacks in rubber, an increase in tensile to a maximum then a gradual decrease. Durometer, Shore type A, increases with loadings, and the elongation decreases with the load.

Mineral Fillers

A combination of mineral fillers and Kosmos 77 with Agripol only resulted in good processing behavior.

	1	2	3	4	5	6
P-345 (Kosmos 77)	140.0	140.0	140.0	140.0	140.0	140.0
Kosmos 77	10.0	10.0	10.0	20.0	20.0	20.0
Kalvan	50.0	....	....	40.0	....	....
Albecar	....	50.0	....	....	40.0	....
Piqua YAA	....	....	50.0	....	....	40.0
Tuads	.25	.25	.25	.25	.25	.25

	7	8	9	10	11	12
P-345 (Kosmos 77)	140.0	140.0	140.0	140.0	140.0	140.0
Kosmos 77	30.0	30.0	30.0	40.0	40.0	40.0
Kalvan	40.0	....	....	40.0	....	....
Albacar	....	40.0	....	....	40.0	....
Piqua YAA	....	....	40.0	....	....	40.0
Tuads	.25	.25	.25	.25	.25	.25

Cured 30 minutes at 297°F.

No.	Durometer	Tensile lbs./in.²	% Elongation	Processing	Flexibility
1	65	425	100	Good	+
2	60	330	140	Good	+
3	58	305	140	Good	+
4	70	470	110	Good	+
5	68	334	115	Good	+
6	70	320	130	Good	+
7	85	480	90	Dry	+
8	72	410	120	Fair	+
9	75	340	120	Fair	+
10	85	490	90	Very Dry	—
11	80	470	110	Very Dry	+
12	78	340	115	Very Dry	+

The above work was done to find the effect of the three calcium carbonate fillers on Agripol for processing, such as milling and tubing. No plasticizer or processing agents were added. Kalvan gave the best results except in the last loading 72 parts of Kosmos 77 and 40 parts of Kalvan were used. This stock could not be bent back on itself without a sharp break. The question probably arises: "Why use such high loadings?" The best physicals, tensile, tear, etc., are so far only obtained by high loadings of filler.

In summarizing, if Agripol is to be used by itself to do a certain molding, tubing or calendering job, the compounder should work with the stocks which give 1200 to 1275 pounds per square inch. These stocks contain high loads of Cabot No. 6 or No. 9, uncompressed blacks, which process quite dry. It has been found that a very small addition of pine tar, paraffin wax or Cumar P-25, give these stocks tack once more, and good processing ability. This treatment increases the elongation with only a very slight loss in tensile strength. This work indicates that one is getting the maximum tensile, elongation, compression set, and has a compound which can be milled, tubed or calendered.

The master batch, Agripol P-360 (black free) has only been under compounding study recently, because of the difficulty in finding mineral fillers and accelerator combinations that would give a stock which could be removed from a mold in one piece. The second problem encountered was getting a hardness over 35 durometer by increasing the fillers. Compounds were made adding 40, 60, 80, 100 and 120 parts of mineral filler on 100 parts of the Agripol polymer, but even the highest load gave a soft stock. This indicated that the fillers used were of the wrong particle size or that they were not properly wetted by the polymer.

A study was then made of a combination of mineral filler with benzothiazole disulfide which threw a different light on a carbon black free compound. The results gave promise of compounding in the proper direction:

	1	2	3	4
P-360	150.0	150.0	150.0	150.0
Silene	60.0			
Calene		60.0		
Titanox C			60.0	
Braytes				60.0
Tuads	.25	.25	.25	.25

Cured 30 minutes at 297°F.

No.	Durometer	Tensile lbs./in.²	Elongation %	Flexibility
1	85	415	25	—
2	55	325	127	+
3	45	285	125	+
4	40	240	145	+

	5	6
P-360	150.0	150.0
Silene	50.0	10.0
Titanox C	....	50.0
D. P. G.	0.5	....
Altox	1.0	1.0
Zimate	....	0.5

Cured 30 minutes at 297°F.

No.	Durometer	Tensile lbs./in.²	Elongation %	Flexibility
5	40	250	180	+
6	60	415	90	+

The primary work shows roughly into which direction Agripol P-360 must be compounded. The above data merely indicate that a combination of fillers and the increased amounts of accelerators are necessary to obtain the best results. The above stocks process very well; however, upon prolonged milling they become soft and tend to stick to the mill rolls.

Agripol P-345 and P-360 compounds have definite limitations, yet there are certain jobs they can do replacing reclaim, natural and synthetic rubber to make it available for more vital use.

Uses

The biggest single use for Agripol is in gaskets for food closures. Gaskets have been made of P-345 for top seal glass jars, being held at 300°F. for 17½ hours, and have given a satisfactory seal. Some flow resulted from this test, but no dryness or brittleness. Gaskets for plumbing supplies, stoppers, bumpers, etc., have also been satisfactorily fabricated.

Other uses are: tubing of varied types; grommets; proof goods; mechanical goods (non-dynamic); cements; and water dispersions.

The high dielectric strength of P-360 makes this material of great promise to the wire and cable manufacturers. The high ozone and corona resistance of Agripol is a natural phenomenon.

Of the utmost importance is the fact that Agripol is compatible with Thiokol, Hycar, Neoprene, Buna S, reclaim and natural rubber to all degrees.

Agripol milled with Hycar, Buna S or Neoprene cuts the milling temperature down out of the danger zone of scorching. The gain in using Agripol as a compounding ingredient in the synthetic rubber field cannot be stressed too much.

The blends of the material did not show any signs of lamination or incompatibility. Further investigation of Agripol as a compounding material to be used as a high grade extender, processing agent, and tackifier for Neoprene, Hycar, Buna S is warranted. Since Agripol has physical properties of note, one gains by its use in safer processing and extension of the stock piles of synthetic and natural rubber.

Training and Responsibilities of Chemical Administrators

By C. M. A. Stine, E. I. du Pont de Nemours & Co., Inc.

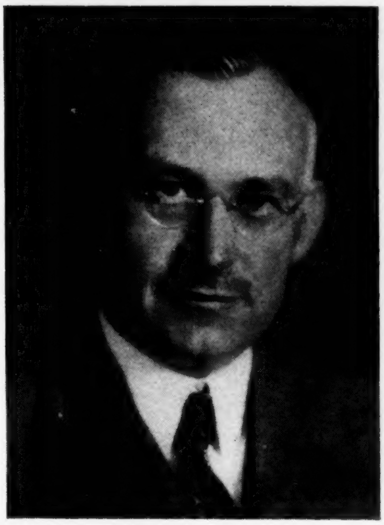
THERE was never a time in the history of chemical industry when there was a greater need for creative leadership than today. The problems incident to the shaping of a postwar policy for this industry are tremendous and require the best leadership we can muster.

The application of chemistry and chemical engineering to the administration of an industrial enterprise requires some additional ingredients such as a knowledge of economics, or personnel problems, of business administration, and a much more than passing acquaintance with the humanities.

One of the most valuable and important attributes in the administration of chemical industry is vision. This, compounded with a number of other ingredients, one of the most important of which is the appreciation of the functions of a research organization, is the characteristic which many men lack who are otherwise qualified for administrative responsibility.

Chemical industry, now more than ever, is confronted with the necessity for deciding which of a long list of new materials available for manufacture are likely to find important and continuing industrial application. New materials of construction have become available, and revolutionary changes are occurring or are in prospect in the cost of various materials for the construction and fabrication of chemical apparatus. These factors place before those responsible for administration in the industry a long list of possibilities for manufacture of new products, for enlarged facilities for manufacture of old products and for new processes of manufacture. Vision and judgment are required in large measure here.

The foundation upon which the man aspiring to administrative work must build, in addition to his professional training, involves certain abilites whch are partly natural and partly *acquired*. Technical and engineering work can be carried on, if not in a business vacuum, at least behind a screen, but administrative direction involves relations with other people. Preparation for administrative engineering work cannot be obtained wholly from books and, if at all, to only a limited extent in schools. The ability to grasp essential facts from an extended treatise and to summarize essential conclusions in cogent language is an asset in communi-



cating ideas to others that it would be very difficult to over-emphasize. This ability *can* be enhanced during the period of preliminary professional training.

Perhaps for the recent graduate it is profitable to undertake the abstracting of worth-while articles, if not for one of the scientific magazines, at least for his own files. This practice of abstracting articles is a most valuable assistance in developing clarity of thought and succinct expression, and this is not only of assistance in the reading and digestion of the large number of reports which pass continually across the desk of the business executive, but it is of tremendous assistance in the presentation of the pros and cons of proposed policies or the planning of a new enterprise.

The ability to make an *oral* presentation without nervousness and embarrassment, in clear and convincing phraseology, is as necessary for successful administrative work as is the ability to write a clear and convincing *written* summary of a situation.

One must associate with people, observe them, and participate in discussion of plans and courses of action in order to develop a proficiency in the handling of people and the influencing of their thinking. When the chemical engineer has worked with workmen, and has been selling with salesmen, and discussing finances with financial men and research plans with technical groups, he begins to acquire the necessary habits of thought and an insight into the various types of minds with which he must deal, if he is to function in an administrative capacity. Every opportunity for enlarging such contacts should be taken advantage of.

Of course, it is obvious that the proper appraisal of the personnel available for carrying on the several specialized functions involved in a technical manufacturing business is a *sine qua non* for the necessary delegation of responsibility and the delegation of authority. In other words, in a technical manufacturing business which involves production operations, finance, purchases, distribution and technical sales service there is need for appraisal not only of this year's needs, which the customer himself recognizes, but of next year's potential needs. All of these functions must to a considerable extent be delegated, and the larger the business and the more complex its operations, the greater the need for the delegation of both responsibility and the necessary authority to make the responsibility function. More than once I have encountered examples of men in administrative positions who wished to delegate responsibility but were quite unable to delegate authority.

To sum up, the requirements for administration of chemical industry are well indicated by the nature of the responsibilities involved in such administration. Training must be adequate for the understanding of research results, plant design, plant control, production problems, industrial relations, sales problems, financial problems, involving such everyday questions as obsolescence, depreciation and plant maintenance. These, along with vision based upon a wide acquaintance with facts and a temperate optimism, are some of the important elements in the picture.

And finally, in addition, every administrator should be diligent and alert in the study of the various proposals for changing the pattern of American enterprise which come with monotonous regularity before the bar of public opinion. It is quite important that those in administrative positions use their capacity for analysis and straight thinking to enable them to determine to what the various proposals will lead in order that they may *support* or *combat* them, in the light of their probable effects upon our national life and prosperity.

The welfare of our citizens is a primary responsibility of those responsible for industrial administration. The effect upon the community and upon the state is an inseparable portion of industrial administrative responsibility.

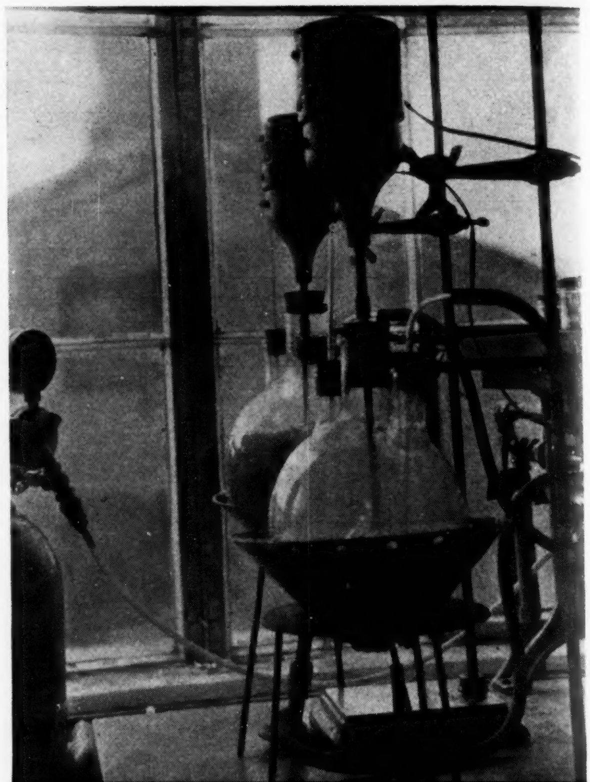
This article is a condensation of a talk before the Junior Chemical Engineers of New York, Feb. 25, 1943.

Non-Ionic Surface Active Agents

Display Unique Characteristics

By Henry A. Goldsmith
Glyco Products Company, Inc.

Though not new to chemical industry, surface active agents are constantly finding new applications and their usefulness is becoming increasingly apparent. Of the three general types—anionic, cationic, and non-ionic—the last has received least recognition despite greater versatility in some respects than the other two. Some of the characteristics and uses of this group are discussed here.



Laboratory-scale preparation of non-ionic surface active agents.

ALL materials known as "surface active agents" have in common the ability to affect strongly the surface properties of a medium in which they are dissolved or dispersed.

There are many ways in which surface activity may manifest itself. The most important applications of surface activity are those designed to lower the surface tension of a medium. For instance, wetting agents greatly lower the surface tension of liquids in which they are dissolved, allowing them to dispel adsorbed air from the surface of solids more readily. Similarly, penetrating agents further the penetration of porous materials, such as fabrics, fibres, leather, or wood, by liquids in which they are dissolved. Emulsifying agents often owe at least part of their action to the lowering of interfacial tension between aqueous liquids and other liquids normally immiscible with them. Detergency and foaming are phenomena closely related to the lowering of surface tension.

Not all surface active agents, however, lower the surface tension. Certain dispersing agents owe their action to their ability to decrease the mutual attraction between suspended or dispersed particles, thus lowering the viscosity of the dispersions and stabilizing them.

Most surface active agents can disperse or dissolve colloidally either in water or in organic liquids. Solutions formed in such a way are often strongly thickened, or even gelled, and are capable of adsorbing clearly, or emulsifying, other liquids normally immiscible with this medium. A great deal of the wide range of solvent power and solubility of surface active agents is due to this colloidal property.

Not all effects of surface active agents are clearly understood. Emulsifying power, foaming power, detergency, and other specific actions, such as the levelling of dyes, the prevention of spattering in shortenings or margarine, the stabilization of emulsions, are all quite complex and are influenced by a number of factors.

Basic Types of Surface Active Agents

As new materials were developed from the original surface active agents, the soaps and sulfonated oils, they gradually overcame some or all of the weaknesses characteristic of those early materials. Many of the recently developed surface active agents have hardly any resemblance to soap in their chemical and physical properties. However, in one way they all resemble soap and sulfonated oils: they owe their activity to a combination of polar groups and non-polar groups, of which the former tend to make the compound water-soluble.

The surface active agents may be subdivided into three basic groups: *anionic*, *cationic* and *non-ionic*.

The group of *anionic* surface active agents is the oldest and best developed. As its name indicates, its surface activity is due to the presence of an oil-soluble anion, or acid radical. To this group of materials belong, among many others, the alkali soaps, the soaps of water soluble amines, the sulfonated oils (such as Turkey Red oil), the sulfonated fatty alcohols and the fatty alcohol sulfates (such as the "Gardinols"), the sulfonaphthenates and petroleum sulfonates, the aromatic sulfonates (such as the sulfonated alkylnaphthalenes), the sulfosuccinic acid esters (such as the "Aerosols"), the aryl-alkyl sulfonates (such as the Twitchell reagents), the sulfonated amides, sulfonated phenols, as well as many other sulfated, phosphated, or borated compounds.

The *cationic* group, of fairly recent origin, is the reverse of the anionic group. Its surface activity is due to the presence of a long-chain, oil-soluble cation, and, consequently, the cationic surface active agents are inactivated or precipitated by anionic agents such as soap. Among the numerous materials belonging to this second group are the salts of long-chain aliphatic amines, certain half-amides of diamines (such as the "Sapamines"), long-chain guanidines, long-chain quaternary ammonium salts (such as the alkyl pyridinium salts), and certain hydroxyalkyl amine esters (such as esters of triethanolamine).

The third group, the *non-ionic* surface active agents, is exemplified by a number of widely used and well-known chemicals which have, however, received less recog-

nition as a clearly defined group of surface active agents than have the other two types. Non-ionic surface active agents, as their name implies, are not ionizable and owe their effectiveness to a proper balance between certain hydrophilic (polar) and lyophilic (non-polar) groups in their molecules. The hydrophilic character is usually obtained by the presence of a certain minimum of accumulated polar groups, such as free hydroxyl or ether-oxygen groups.

Types of Non-Ionic Surface Active Agents

In accordance with this observation, the majority of materials suggested and used as non-ionic surface active agents are from the following categories:

1. partial esters of polyhydric alcohols with long-chain carboxylic acids,
2. partial and complete esters of certain water-soluble hydroxyalkyl ethers of polyhydric alcohols with long-chain carboxylic acids,
3. ethers of polyhydric alcohols with long-chain fatty alcohols,
4. short chain hydroxyalkyl ethers of polyhydric alcohols esterified with long-chain fatty alcohols,
5. long-chain alcohols with a number of free hydroxyyl groups,
6. esters of long-chain alcohols with polyhydroxy acids,
7. long-chain acetals of polyhydric alcohols,
8. condensation products of fatty acids with protein decomposition products.
9. amides prepared from long-chain amines and polyhydroxy acids.

Among these groups, the first two are probably the most easily accessible, and many chemicals of these classes are already on the market under chemical or trade names. Drawing from these two groups alone, considerable variety is possible. From the study of the esters of polyhydric alcohols and of polyhydric alcohol esters, this type of non-ionic surface active agent offers many advantages. The stability of non-ionic surface active agents toward salt solutions, hard water, earth alkali or heavy metal salt solutions is usually far greater than that of cationic or anionic agents of a similar degree of water solubility. Some of them are not affected, or only little affected, by limited contact with strong acids or alkalis. They are neutral, but may be adjusted to give an alkaline or acidic reaction without necessarily losing their usefulness. They may be used in conjunction with either the cationic or anionic surface active agents, and such combinations usually have greater effectiveness than either of the ingredients alone. For instance, blends of polyhydric alcohol esters with soaps are well-known as effective emulsifiers.

Pilot plant equipment for making new non-ionic surface active agents.

Table I—Properties of Some "Non-Dispersible" Non-Ionic Surface Active Agents

Compound	Form	Melting Point °C.	Miscibility* with— Ethanol	Acetone	Toluene	Naphtha	Mineral Oil
Ethylene Glycol							
Mono Laurate	Semi Solid	28–30	M	M	MH	M	M
Mono Oleate	Semi Solid	....	M	M	MH	M	M
Mono Ricinoleate	Liquid	....	M	M	MX	MX	I
Mono Stearate	Solid	59–61	MH	MH	M	MH	MH
Propylene Glycol							
Mono Laurate	Liquid	....	M	M	M	M	M
Mono Oleate	Liquid	....	M	M	M	M	M
Mono Ricinoleate	Liquid	....	M	M	M	M	MH
Mono Stearate	Solid	37–39	MH	M	MH	MH	MH
Diethylene Glycol							
Mono Laurate	Liquid	17–18	M	M	MX	PM	MX
Mono Myristate	Semi Solid	35	MH	M	PM	PM	PM
Mono Oleate	Liquid	....	M	M	M	M	M
Mono Ricinoleate	Liquid	....	M	M	M	M	MX
Mono Stearate	Solid	42–43	MH	MH	MH	MH	MH
Glycerol							
Mono Laurate	Semi Solid	22–23	M	M	M	M	M
Mono Oleate	Semi Liquid	38	M	M	PM	PM	PM
Mono Ricinoleate	Liquid	....	M	M	PM	I	I
Mono Stearate	Solid	55–57	MH	MHX	MH	MH	MH
Sorbitan							
Di Laurate	Semi Liquid	40–50	M	PM	M	M	M
Di Oleate	Liquid	....	MX	M	M	M	M
Di Stearate	Solid	42–43	MH	M	M	M	MH

* Abbreviations: M—miscible; P—partly; X—in limited proportions; I—immiscible; H—hot. Miscibility in the case of solids refers to the melted material.

The non-ionic surface active agents are superior to the anionic and cationic agents in range of compatibility with solvents and chemicals. Their effectiveness may be further improved by the addition of certain solvents, such as alcohols, glycols, or glycol-ethers, terpene alcohols or fatty acids. Their adsorption by wool and possibly by other fibres is less than that of anionic or cationic materials. They usually will not react with weak organic acids or bases used in conjunction with them, such as certain dyes or pharmaceuticals.

The non-ionic surface active agents may be roughly divided into three classes, according to their behavior with water. There are those that do not, or only poorly, disperse in water, but may have the property of imbibing a quantity of it. We shall refer to them as *non-dispersible.* The second group will disperse when stirred or shaken with water. Some of the materials in this group are able to absorb considerable quantities of water without turning cloudy. We shall call these materials *dispersible.* The last group is water-soluble, the solutions formed being clear, or opalescent, like those of soap.

There are no distinct boundaries between these groups, and materials of each type may be obtained by various combinations of chemicals. Small admixtures of alcoholic solvents or fatty acids can shift their solubility properties considerably; sometimes a material will dissolve clearly in high concentration, but yield a milky dispersion on greater dilution; sometimes the presence of electrolytes will diminish the water solubility of these materials.

The Non-Dispersible Type

The non-ionic surface active agents of the non-dispersible type have already found numerous uses. While they resemble oils greatly, they have a much lower surface tension and will effectively lower the surface tension of oils in which they are dissolved. Some of them have been found to form water-in-oil emulsions and help to stabilize them, such as in shortenings or in margarine, and to improve the baking qualities of certain types of pastry. Some have a distinct wetting effect upon pigments in oil or solvent media, facilitating grinding, dispersion or suspenson.

All of them act as strong assistant emulsifiers and improve the action of small

amounts of soap, fatty alcohol sulfates, aryl sulfonates, and similar materials.

They are often of value as lubricants, plasticizers and softeners; they serve as mutual solvents for polar and non-polar materials like soap and mineral oils, or for soap, alcohol or water, and vegetable oils, and as solvents for sterols, phosphatides, dyes, or pharmaceuticals. They have been found to act as pour-point depressants for lubricating oils, as crystallization inhibitors for certain vegetable oils, as stabilizers for anti-detonant solids suspended in fuels, as dispersing agents for peanut solids in peanut butter and for cocoa in chocolate fat, as solvents for metallic soaps, as water-absorbent bases for suppositories, and in preparing specimens for the microtome. They are useful stabilizers for quick-breaking insecticidal spray emulsions. Generally speaking they are most useful where action on a non-aqueous medium is more important than that on an aqueous one.

Materials of this type are available in numerous forms. Monoesters of ethylene glycol, propylene glycol, diethylene glycol, triethylene glycol and glycerol, partial esters of mannide, mannitan, sorbide, sorbitan, and pentaerythritol, with fatty acids, are typical examples. Each of these materials may appear in several modifications, depending upon their free acidity, their free alcoholic content, and the proportion of mono-, di- and polyesters in them, which all affect the materials' behaviour (see Table I).

The Dispersible Type

The *dispersible* non-ionic surface active agents are closely related to the non-dispersible materials and have many of the same uses. In addition, they are of interest as excellent emulsifiers for the oil-in-water type as well as the water-in-oil type, which fact makes them the most interesting type of non-ionic surface active agent. They serve as thickeners for aqueous media; self-dispersible lubricants or sizing agents for textile or metal working operations; emulsifiers for "soluble oils"; solubilizers for perfume oils or antiseptic compounds in water; ingredients of foaming, detergent and wetting compositions. They should also find use in flotation processes.

This type may be exemplified by certain sorbitol, sorbitan, mannitol, mannitan and polyglycerol esters as well as by esters of certain medium length chain polyethylene glycols, such as those with four to fifteen ethylene groups (See Table II).

Table II—Properties of some "Dispersible" Non-Ionic Surface Active Agents

Compound	Form	Melting Point °C.	Miscibility* with				
			Ethanol	Acetone	Toluene	Naphtha	Mineral Oil
Tetraethylene Glycol							
Mono Stearate	Solid	29–30	MH	MH	MH	MH	MH
Di Stearate	Solid	32–33	MH	PM	M	PM	M
Hexaethylene Glycol							
Mono Oleate	Liquid	....	M	M	M	MX	MX
Nonaethylene Glycol							
Di Laurate	Liquid	....	M	M	M	M	MH
"Mono" Oleate	Liquid	....	M	M	M	MX	MH
Di Oleate	Liquid	....	M	M	M	M	M
Mono Ricinoleate	Liquid	....	M	M	M	I	I
Di Ricinoleate	Liquid	....	M	M	M	I	I
Di(Tri)Ricinoleate	Liquid	....	M	M	M	M	M
Mono Stearate	Semi Solid	27–29	M	M	M	MH	MH
Di Stearate	Solid	29–31	M	M	M	MH	MH
Dodecaethylene Glycol							
Di Laurate	Semi Solid	30–39	M	M	M	PM	PM
"Mono" Oleate	Semi Solid	30–39	M	M	M	MX	PM
Di Oleate	Semi Solid	25–35	M	M	M	MX	PM
Di Ricinoleate	Semi Solid	25–35	M	M	M	I	I
Di Stearate	Solid	29–30	MH	MH	MH	MH	MH
Mannitan							
Mono Laurate	Liquid	....	M	M	M	M	M
Mono Oleate	Liquid	....	MX	M	M	M	M

The Water-Soluble Type

This group of the non-ionic surface active agents resembles the dispersible type, but it is no longer easily compatible with all non-polar solvents. Aqueous solutions of these materials are opalescent or even completely clear. In this group are found compounds capable of good wetting and penetrating action, particularly for aqueous solutions of electrolytes and metallic salts. Some of the compounds are emulsifiers and dispersing agents useful under special conditions, such as high electrolyte concentration. Many also have a frothing action. There are certain emulsions which will not stand up if stabilized by compounds of the dispersible type alone, but are stable when a compound of the water-soluble type is added. Many of them will improve the stability and action of other wetting agents.

This type of compound can be exemplified by certain partial esters of highly polymerized glycerol, of hydroxyalkyl ethers of glycerol, sorbitol or mannitol and esters of long-chain polyethylene glycols (see Table III).

Table III—Properties of some "Water-Soluble" Non-Ionic Surface Active Agents

Compound	Form	Melting Point °C.	Miscibility* with				
			Ethanol	Acetone	Toluene	Naphtha	Mineral Oil
Nonaethylene Glycol							
Mono Laurate	Liquid	....	M	M	M	MX	I
"Mono" Laurate	Liquid	....	M	M	M	MX	MH
Mono Oleate	Liquid	....	M	M	M	MX	I
Dodecaethylene Glycol							
Mono Laurate	Semi Solid	30–39	M	M	M	I	I
Mono Oleate	Semi Solid	30–35	M	M	M	I	I
Mono Ricinoleate	Semi Solid	25–35	M	M	M	I	I
Mono Stearate	Solid	36–37	MH	MH	MH	MH	PMH
Highly Polymerized Glycol							
Di Laurate	Solid	53–54	MH	MXH	MH	I	I
Di Oleate	Solid	50	MH	MH	MH	I	I
Di Ricinoleate	Solid	50	MH	MH	MH	I	I
Di Stearate	Solid	52–54	MH	MH	MH	I	I

* Abbreviations: M—miscible; P—partly; S—in limited proportions; I—immiscible; H—hot. Miscibility in the case of solids refers to the melted material.

Future Possibilities

Many specific uses have been found for all three types of surface active agents. There are innumerable conditions under which a surface active agent is required to act, and problems often arise where it is essential that soap, sulfates, ash or alkali, amine or acid should be absent. Sometimes it is desirable that ion-exchange with calcium, magnesium, aluminum, or iron should not affect the colloidal equilibrium. At other times, materials of a wide range of miscibility without residue are necessary.

Numerous new applications of surface active agents are "just around the corner." Chemical reactions of immiscible phases may be carried out in mutually solubilized or emulsified condition. Certain processes already apply this principle. Washing and laundering may be done without alkaline detergents. More and more materials such as coatings, lubricants, inks, impregnations, foods and drugs will be used in emulsion form. Perfumes without alcohol and lacquers without solvents are already a reality. Many such problems are appearing daily, and the non-ionics give promise of solving some of them.

Wanted — More Synergism!

"What is Synergism?" you well may ask. To put it succinctly, you might say that synergism is the force that can make 2 + 2 = 5.

Synergism is not a new word. It has its roots in the classic Greek (Συν — together; Εργον — work) and has long had its connotations for the chemist, the doctor and the theologian. Basically, it always has meant forces working together to produce a whole greater than the sum of the parts.

Now, "Synergism" emerges, in its larger sense, with a meaning for industry, bred of war accomplishment.

For the miracles of war production are in no small part due to the meeting of minds, working together as a creative stimulus—minds that "click," as we call it on the street—so that the net result is always greater than the sum total of the individual ideas. From synergistic thinking, evolve the great mechanisms, the new synthetics, the magnificent product creations which comprise materiel for Victory.

Synergism may apply to individuals working together, to groups, to companies—across a table, in the laboratory, in the field. It is the newer concept for industrial mentality. Now, as never before, it is evident that industrial progress revolves about the stimulus created by minds working together to "click" creatively. Synergism is a much needed component for post-war development—not as an abstract philosophy, but as a practical working force.

Here at Atlas, we are "Synergism-minded." In our own fields of chemical endeavor, we have acquired a degree of expertness which can be applied synergistically to products now to create results far beyond present design expectations. Add synergism to cooperation and miracles become commonplace.

We would like to talk with you.

Industrial Chemicals Department

ATLAS POWDER COMPANY

WILMINGTON, DELAWARE

Offices in Principal Cities

CHEMICALS ATLAS EXPLOSIVES

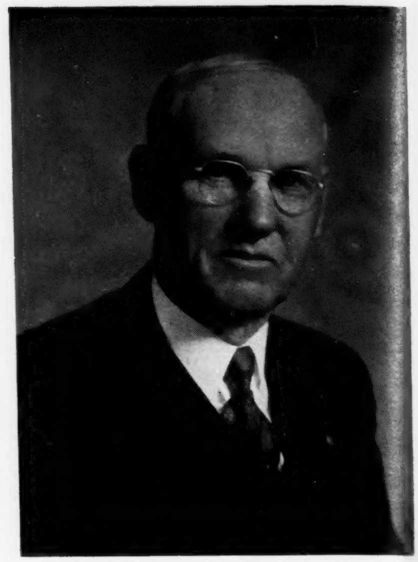
Industrial Explosives • Industrial Finishes • Coated Fabrics • Acids
Activated Carbons • Industrial Chemicals • Ordnance Materiel

A. I. M. E.

Annual Meeting

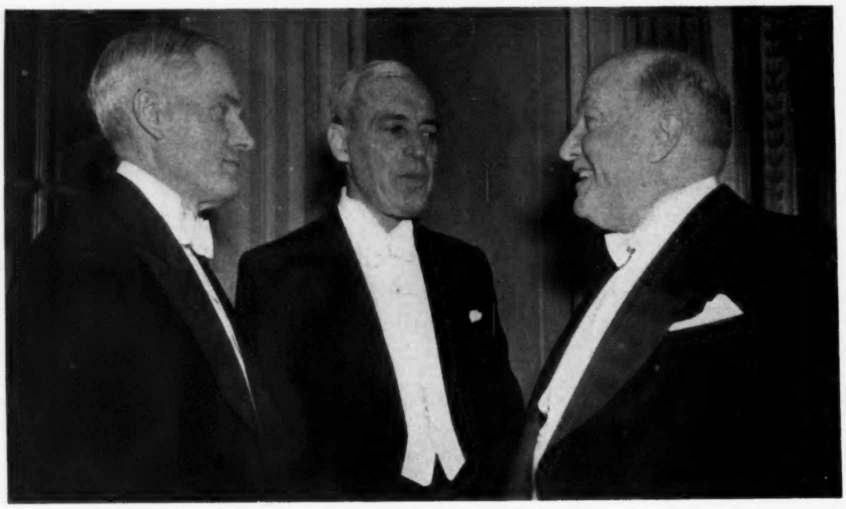
American Institute of Mining and Metallurgical Engineers held their 158th meeting in New York City from Feb. 15 to Feb. 17. Some 200 scientific papers were presented in about 50 technical sessions that crowded the four day calendar. Featured were meetings on strategic materials.

Below, at the Institute's banquet Paul D. Merica, recipient of an honorary membership certificate which is the highest of A.I.M.E. honors, and Sir Owen Dixon, Minister Plenipotentiary of Australia who accepted the honorary membership award accorded Mr. E. Lewis (photographed at lower right), and William M. Jeffers, the principal speaker at the annual dinner.



Above, President-elect C. H. Mathewson of Hammond Laboratory, Yale University. Right, Eugene McAuliffe, former A.I.M.E. president and president of Union Pacific Coal.

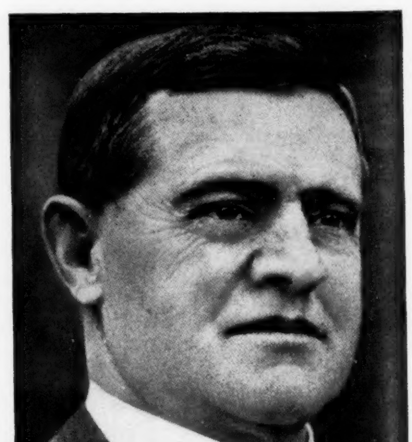
Below, John R. Suman awarded the Anthony F. Lucas Gold Medal "for distinguished achievement in improving the technique and practice of producing petroleum."



Below, Marcus A. Grossmann presented the Robert W. Hunt Award for 1943 for his paper, "Hardenability Calculated from Chemical Composition."

Annual J. E. Johnson Award received by James M. Stapleton, below, in recognition of his work on blast furnace filling, described in his paper on "Results Obtained from Surveys of Gas and Furnace Tops."

Australian Director-General of Munitions and Director of Aircraft Production, Easington Lewis, below, was not present at the meeting but was awarded a certificate of honorary membership.



More Chemical Plants Fly the "E" for Excellence

Each month more chemical plants are awarded the Army-Navy "E" and give us tangible evidence of the splendid production records made by the American chemical industry and its workmen.
Pictures of several presentations during the past month are shown here.

At the right. Lt. Leona Jackson, U. S. Army nurse recently released from Japanese capture, pins the Army-Navy "E" emblem on a Sharples Chemicals, Inc., employee at the award ceremonies at Wyandotte, Michigan. Mr. P. T. Sharples, looking on, appears highly gratified.

Below. Proud workers of the Frankford, Pa., plant, Barrett Division, Allied Chemical & Dye Corp., listen to Lt. C. M. Justi, U. S. N. R. who is giving the presentation speech at an "E" award for excellence in production.

Below, left. More than 3000 employees and their guests gathered in front of the main bulding at Merck & Co., Inc., Rahway, N. J., on Feb. 9 for an impressive presentation of the Army-Navy "E" by Major General James C. Magee, Surgeon General of the Army.

Below, right. The "E" flag awarded to the Niagara Falls plant of The Mathieson Alkali Works (Inc.), Feb. 26 is held by (left to right) Lt. Commander George W. Eighmy, U. S. N. R.; Col. Harry A. Kuhn, Chemical Warfare Service; G. W. Dolan, executive vice-president of the company; and Frank A. Sweet, Chairman, Plant Employee Committee.

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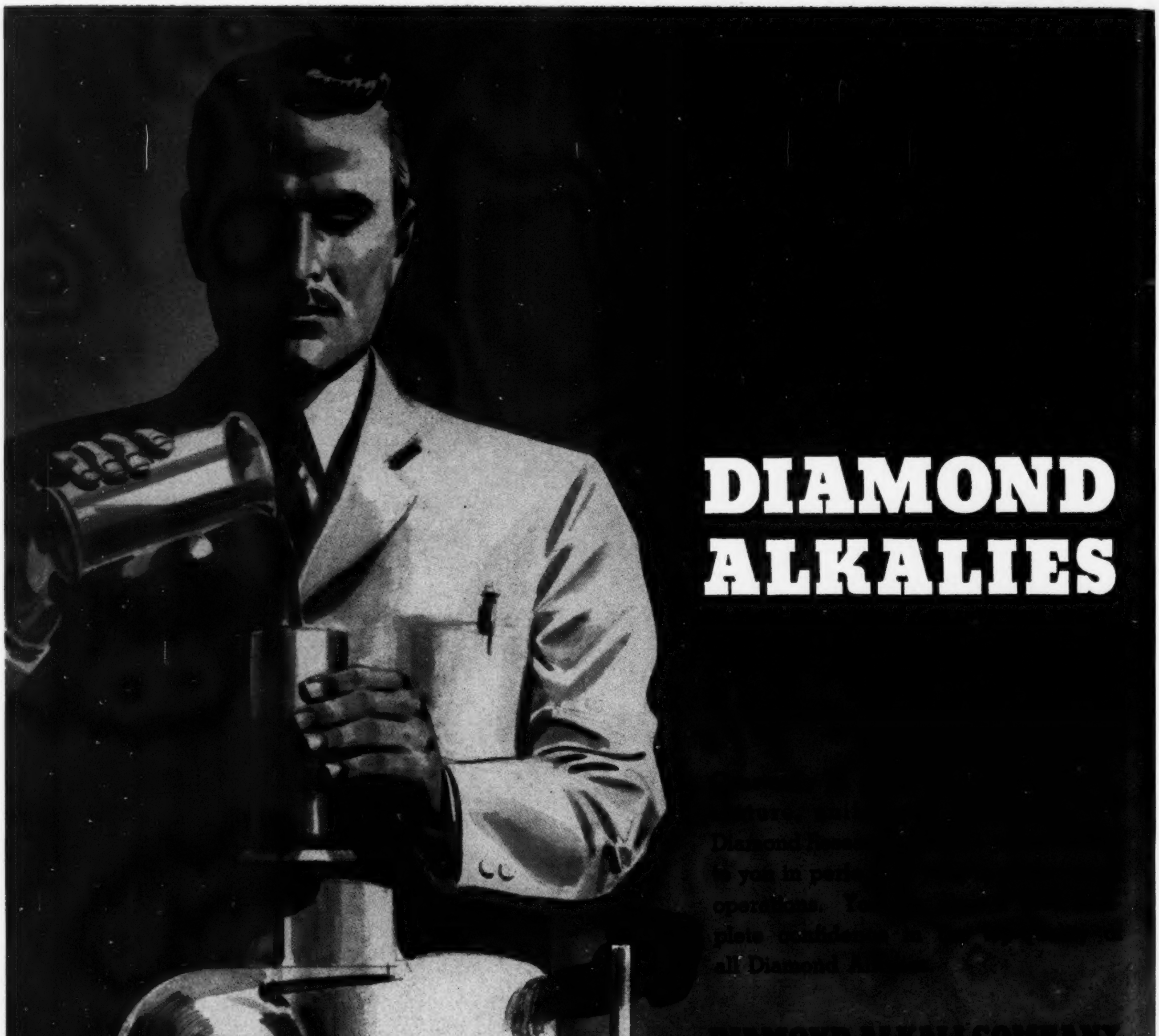
Smoke for Camouflage. **. . This smoke in an upstate New York valley was produced in a few minutes by a small model of a new mechanical smoke generator which has been developed by Dr. Irving Langmuir and Vincent J. Schaefer of the General Electric Research Laboratory through the National Defense Research Council for the Chemical Warfare Service of the Army. By utilizing liquid material efficiently it produces for camouflage purposes clouds of smoke so dense and persistent that areas may be covered economically for long periods. The picture below shows Dr. Langmuir standing beside the new generator.**

Ray Guns for Research. **. . L. F. Ehrke, Westinghouse research engineer, is shown examining an unfinished 300,000 volt X-ray tube to be used for examination and study of steel armor plate and rapidly moving machine parts.**

Plastic Bearings. **. . A Westinghouse machinist is shown, below, checking the diameter of a propeller shaft bearing made of Micarta, a tough plastic being used to replace rubber, metal or wood.**

Chemical Pups. **. . Last summer workmen at a Koppers synthetic rubber plant adopted a friendless, homeless dog. They named her Styrene. Not long ago, Styrene undertook a project of her own which produced five puppies. All were named after related chemicals—butadiene, ethylene, toluene, benzol and alcohol. Four have been adopted into homes of workmen, only Butadiene, held by the young lady, remains to carry on with her mother.**


DIAMOND
ALKALIES

Tri-Sure News

NUMBER 3 ★ 30 ROCKEFELLER PLAZA, NEW YORK, NEW YORK ★ MARCH, 1943

STEEL DRUM USE FURTHER RESTRICTED

Steel drums may not be used to pack sand, water, bird seed, and eleven chemicals, under the terms of limitation order L-197 as amended February 1 by the Director General for Operations. The amendment is effective March 1. The eleven chemicals are:

Ammonia alum, dry ammonium nitrate, dry boiler compounds, magnesium chloride, $6H_2O$, potash alum, soda alum, soda aluminate, soda bisulfate, soda nitrite, and soda tetraphosphate.

At the same time the amended order grants permission for the packing in steel drums of certain other chemicals, for which substitute containers have been found impractical. These are:

Monohydrated copper sulphate, amyl acetate, amyl alcohol, from all sources, amyl phthalate, butyl alcohol, butyl acetate, butyl oxalate, butyl phthalate, ethyl acetate, ethyl carbonate (all grades), ethyl oxalate, ethyl phthalate, sodium chlorate, and potassium chlorate.

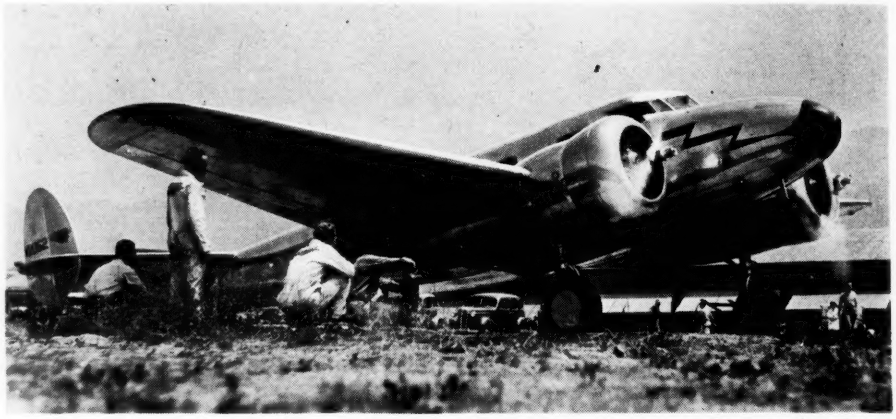
Other changes made by the amended order are:

1. Certain oils and greases are transferred from list A to list B. List A contains items which may not be packed in steel drums. Items on list B can be packed in new or used steel drums in the hands of the packer prior to September 14, 1942, or in used drums manufactured before that date and purchased and delivered to a packer prior to November 7, 1942.

2. Exempted from the terms of the order are steel drums having a capacity of more than 30 gallons and a steel gauge lighter than 23.

3. Drums containing materials to be incorporated in certain military items are exempted from the restrictions. The order as previously amended exempted only drums containing materials to be delivered directly to the Army, Navy, and other listed agencies.

4. Drums containing materials to be used for repair, maintenance, or operating supplied aboard ship are also exempted from the restriction.



Courtesy Aero Digest

Special Plane Flies Four Thousand Miles for TRI-SURE Plugs

A twin engined Lockheed plane of the U. S. Army was sent from Edmonton, Alberta to St. Catherines, Ontario, Canada, via Chicago for a special consignment of Tri-Sure plugs for use on gasoline drums for shipment on the Alaskan Highway Project, entailing a return flight of four thousand miles.

WAR DECLARED ON THE GROMLINS

For many months an untiring team of experts have been studying the habits of the Gromlins, American cousins (twice removed, once by Gimbel's and once by Macy's) to the British Gremlin. They are believed to have come over to this country on the Cauliflower, which arrived just behind the Mayflower, round about the time the Pilgrim Mothers were discussing the idea of a Victory Garden in Central Park, New York.

It seems the Gromlins (Elaxidasicusses in the Latin) are divided into three clans, but their work is more or less the same.

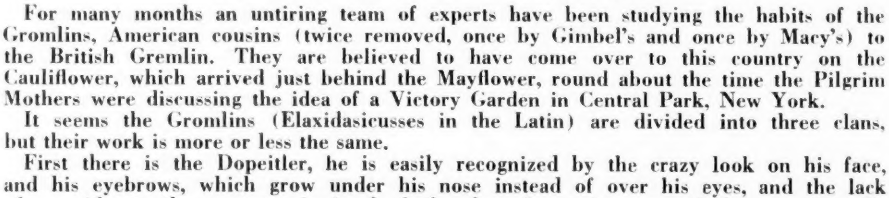
First there is the Dopeitler, he is easily recognized by the crazy look on his face, and his eyebrows, which grow under his nose instead of over his eyes, and the lack of ears (due to the constant pinning back they have been given recently by an unfriendly bear), these have now totally disappeard. His pleasure is to tamper with drums, by unscrewing the plugs thereby allowing foreign matter to percolate inside and leakage.

Then there is his first cousin Snakeito. He can be recognized by the fanatical look of cunning on his face, while daggers sprout from where his ears should be, this being due to his habit of stabbing people in the back. His pleasure is to drop metal filings and other matter into empty drums, which when filled with gasoline or oil constitute a danger to any craft into which it is put.

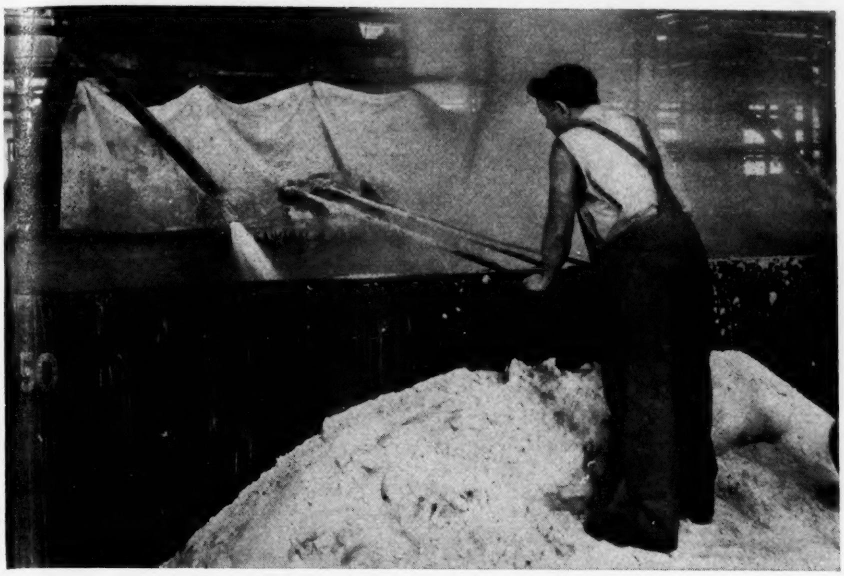
His second cousin by habit is Slobenito, he is a funny little gink who is so puffed up with his own importance that his chin protrudes so far he is constantly tripping over it thereby making his face very red from his constant falls. Through being led around so much his ears have grown into the shape of a donkeys and it is rumored that when he brays they flap to and fro. This little guy has never grown up, being still in the kindergarten stage and so delights in picking up plugs when they are taken from drums, and hiding them so that they are never found again, thus making it necessary to supply another plug, until which time the barrel is useless.

Acting on the advice of the experts at this experimental station, war has been declared against these Gromlins. A weapon in the form of the TRI-SURE SEAL has been brought into action. To date the results have been extremely satisfactory, it being reported that so far no Gromlin has succeeded in penetrating the SEAL to tamper with the plug or the contents of the drums. It appears that on finding all their efforts to no avail the little fellows beat their brains out on the SEAL and then cry themselves to death.

Editor's Note: Any similarity between the Gromlins and any person or persons living, half dead or completely dead is purely accitentional.



SOAP, *An Important Dispersing Agent*



Left. Soap is produced in huge quantities. This soap kettle in the plant of Kirkman & Son in Brooklyn is two stories deep, thirteen feet square and holds 45,000 lbs. of soap materials.

By Georgia Leffingwell, Ph.D.

ONCE considered a laboratory phenomenon, dispersions and suspensions now are playing a significant role in the mighty battle of production which is being waged behind the lines. A list of the industries which use these products would cover practically the entire range of America's war effort. In essentially every case "protective" substances are necessary to stabilize the suspensions, to keep them from agglomerating or settling. The protective substance most used is ordinary soap.

The reasons for the relatively unexpected and almost unnoticed rise in the use of dispersions are, namely, these:

1) Many substances, ordinarily applied dissolved in relatively expensive solvents, can be "diluted" by dispersion in water. In this group we find the emulsion insecticides, paints, metal-cutting lubricants, and waterproofers.

2) Suspensions in many cases give better penetration. Here we meet the waterproofing, sizing, bitumen, and leather treating dispersions; and

3) Subdividing a substance into millions of tiny particles exposes an enormously increased surface for speedy chemical reactions. Included in this group are synthetic rubber, plastics, paint, and ink.

In many cases, several reasons account for the preference given dispersions. In others, special reasons, to be mentioned, explain their use.

Soap is not only a stabilizer of high efficiency, it is also cheap, easily available, and reliably standardized. A number of chemical and physical properties likewise contribute to make soap the most generally useful of industrial dispersion stabilizers.

Before proceeding to a description of the more recent examples of soap-stabilized dispersions in various industries, it seems advisable to remind the reader that soap actually is a mixture of soaps which vary in length of chain, degree of saturation, and so forth, and, consequently, in their physical and chemical properties. The proportions of these different soaps vary according to their origin and the significance of this fact is often observed in the literature, for chemists usually specify the type of soap to be used. The choice of soap in a dispersion should be carefully considered in relation to resistance to hard water, temperature optimums, emulsifying, foaming, and others if the highest efficiency is to be obtained.

The most dramatic, and probably the most important, application of soap-stabilized emulsions is in the manufacture of synthetic rubber. Most of the synthetic rubber to be manufactured in the United States will be of the Buna type, made by the copolymerization of butadiene and another substance, emulsified in a soap solution. The importance of soap (and the magnitude of our war effort) is indicated by the recent estimate that 100,000,000 pounds of soap annually will be consumed in rubber manufacturing processes.

It is often said that the United States is the cleanest nation on Earth. If consumption of soap is an index, this is certainly true as we produce over three billion pounds annually and have a per capita consumption of about twenty-five pounds. However, aside from the washing-up side, soap is an important industrial product. In this article our author tells of its uses as a protective substance in many suspensions and dispersions.

The general idea of polymerization in the emulsified state dates back at least as far as 1930, when a patent was granted for the manufacture of a synthetic rubber from butadiene alone.[1] This rubber could be used only when mixed (as a latex) with natural latex. Du Pont chemists soon came out with chloroprene, likewise polymerized in a soap solution, this time from chlorobutadiene.[2] The essential improvement of copolymerization then appeared in the patent literature with the prototypes of our modern war rubbers.[3] After the first hesitant steps were taken, work in this promising direction continued at a faster pace, particularly in the United States, until the many high-quality synthetic rubbers of today were developed. In many of the intermediate stages, soap was a preferred emulsifying agent.

A new synthetic rubber seems to be worthy of attention. This rubber, claimed to have high resistance to oils and solvents, is made by copolymerization of chlorobutadiene and 1-cyanobutadiene-1,3 as an aqueous emulsion, stabilized by soap.[4] An interesting method of making a styrene resin calls for emulsification of styrene in soapy water and hydrogen peroxide.[5]

The advantages of high subdivision are utilized in an ingenious procedure for the wetting with oil of pigments made in the "wet way."[6] Pigments made in an aqueous medium are usually pressed, dried, and ground, and then reground in the oil medium. To avoid these costly steps, a naphtha emulsion in soap water is added to the pigment paste where the finely divided solvent particles, with the aid of

the soap, displace the water from the pigment particles. The emulsion is readily broken by the addition of an alkaline earth metal salt or an acid, which removes the soap from the field of action, and the mixture is filter-pressed and dried in the ordinary way. The pigment, which has been dewetted, dries to a fine powder which may be simply mixed into the oil medium. A similar device is applied in several other pigment patents.[7]

In Paints

The current shortages of organic solvents may keep many an industrialist awake nights, yet thanks must be given to dispersion methods for an enormous savings in solvents. Aqueous paints, for instance, made by dispersing synthetic resins, plus pigments, plasticizers, and other modifiers, in water (usually with soap as a stabilizer), are revolutionizing the paint industry. Freedom from expensive, poisonous, inflammable solvents, quick drying, high covering power, and excellent wear make these paints a powerful contribution to national offense. At present, shortages permit the use of the new water paints only for war purposes, such as gun emplacements, munitions depots, and large war plants. Alkyd resins[8] are most popular; triazene resins[9] and others have been used. Lacquers made from cellulose derivatives and other film-forming substances have been applied in the form of soap-stabilized dispersions.[10]

Another group, which much earlier learned the technique of solvent saving, is the insecticide industry. Since insecticides are usually sprayed onto plants, solvent recovery is impossible; moreover, the low solubility of some poisons would necessitate using impractical amounts of organic solvents. As a consequence, soap-stabilized dispersions have come into wide use, being applied particularly to mineral oils,[11] pyrethrum,[12] derris,[13] phenols,[14] and heavy-metal soaps.[15] Experiments with newer synthetic organic chemicals, such as dichloro-ethyl ether[16] and 1,2,4-thiadiazoles[17] are extending the number of soap-water suspensions.

The good wetting powers of soap increase the usefulness of the insecticides by enabling the spray to spread to all parts of the plants and to wet or penetrate the waxy coats possessed by most insects. The soap itself has a certain amount of insecticidal power, possibly by chemical action or by blocking the breathing tubules of the insects on drying out. In the case of the mineral oils, emulsification also decreases their harmfulness toward plants and increases it toward insects. The significance of these types of dispersions to the "more food" effort can hardly be overemphasized, in view of the annual destruction by insects of hundreds of millions of dollars worth of farm products in the United States alone.

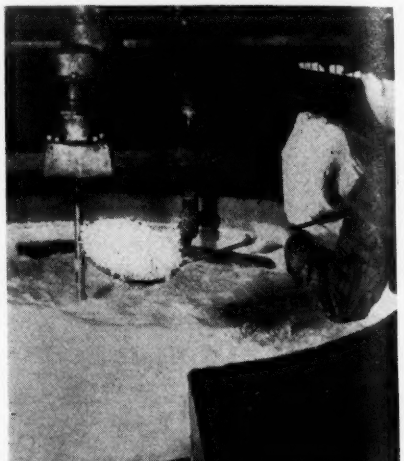
Metal-cutting operations, as everyone knows, requires continuous lubrication to reduce wear and power requirements and to produce a good piece of work. Oils, the preferred friction-reducing medium, are comparatively expensive and, moreover, have a low heat capacity and undesirably high viscosity. By emulsifying the organic liquid in soap and water, the chemist in one fell blow retains the lubricating qualities of the oil (as well as some from the soap), gains great economy by dilution, obtains good cooling characteristics, and —since soap lowers surface tension— achieves good wetting and quick penetration to the point of cutting. Similar suspensions are used in metal-drawing operations, particularly in wire drawing.[18] An unusual, recently patented all-around metal working lubricant consists of a dispersion of ferrous oxide and calcium soap in soap water.[19]

Waterproofing

Another great field is the preparation of waterproofing, sizing, and other protective coatings for fibrous materials. We all remember the ugly, non-porous, heavy raincoats of not so long ago; today we can witness a near-miracle in waterproofing—the light, airy, water-repellent cloth with the pleasant "feel." Modern waterproofing methods, to a major extent, utilize soap-stabilized dispersions of waxes, aluminum soaps, rubber, and other materials to achieve this effect. While waxes, rubber, and aluminum soaps can be applied dissolved in an organic solvent, this is an expensive and hazardous procedure. Dispersions in water, on the other hand, permit safe and cheap application. Moreover, the fine particles readily penetrate the fibers, sticking essentially to the threads, and thus avoid the lump-forming tendency of solvent applications.

A great variety of dispersion waterproofing methods are available. An improvement on the usual wax or asphalt suspension is described in a patent granted the Bakelite Building Products Company,[20] in which it is pointed out that the particle size is of great importance. In their procedure, about 2 parts of soap are dissolved in 100 of water, 100 parts of paraffin wax (or other water-repellent substance) then added, the mixture heated to melt the wax, and the latter emulsified with a high-speed mixer. On cooling, a stable creamy dispersion is obtained which should be diluted just before using. On dilution, the particles aggregate to form groups of the proper size for good proofing. Incidentally, this and many other waterproofing dispersions can be used for textiles; paper, leather, feathers, cement, mortar, and other porous materials.

The chemical reactivity of soap is also utilized in many dispersions where some aluminum salt is added to a soap solution to produce a dispersed water-repellent precipitate of aluminum soap. Mixed wax and aluminum soap dispersions have recently been described. One method uses a soap aid, consisting of the sodium salt of a polymeric acid, which also reacts chemically with the aluminum salt to yield a waterproofing aluminum salt.[21] Another calls for an unusual soap, made from montan wax, together with cetyl alcohol, an aluminum salt, and a wax.[22] A novel point here is the addition of salts of the tetravalent metals (uranium, zirconium) to the aluminum salt solution to minimize loss of water-repellency on dry cleaning.



An important application of soap is in the manufacture of synthetic rubber, where polymerization is carried on in a soap solution. The picture above shows a vat of the raw synthetic rubber after it came from the polymerizers and was coagulated with dilute acids.

A permanent waterproofing can be obtained by treating cellulosic materials with an emulsion of dioctadecyl carbonate and benzene in soap and water.[23] On mangling, drying, and heating, a permanently bonded water-repellent effect is reported. Rubber dispersions also give a good, permanent proofing. One such dispersion consists of a solution of rubber in benzene, the whole emulsified in soap and water.[24] Other rubber suspensions, many of which are suitable for coatings, will be described later in this article.

A recent application of synthetic polymers (other than the synthetic rubbers) to waterproofing is disclosed in an American patent.[25] Polymers of ethylene are tough, cheap, and readily available, but are ordinarily difficult to use, having high melting points and low solubility in organic solvents. By working soap and a protective colloid into the polymer while a little below its melting point, and then adding water, a satisfactory aqueous dispersion of the hydrocarbon can be made.

At this point, an ingenious method of preparing dispersions, similar to the above, should be mentioned.[26] The water-repellent substance is melted, mixed with soap, atomized with a sprayer, and allowed to cool and solidify while settling in the air. This results in an extremely fine and dry powder which may be stored indefinitely, transported with great economy, and dispersed in water by simple mixing at the last minute.

An industrial dispersion which has grown rapidly in importance in the last decade is the bituminous dispersion, customarily referred to as an emulsion. These aqueous suspensions of a wide variety of asphalts and bitumen-like materials have come to be used in road building and repairing, soil stabilizing, waterproofing and dampproofing cement[27] and paper, the manufacture of building blocks, roofing, and still other diversified fields. Bitumens require heating in order to make roofs or roads. But by merely emulsifying the molten bitumen in a solution of soapy water, a suspension is obtained which can be used in roofing and road building even in damp or cool weather and without expensive heating on the site of application. Moreover, the much diminished viscosity enables the bitumen particles to penetrate the soil (or cement, or paper) much more efficiently, giving better bonding and excellent soil stabilizing effects. Such dispersions are now finding important military use in rendering the soil of airfields, parking spaces, and roads resistant to rain water.

War Applications

An application of great interest to the prosecution of the war has recently been described by C. W. Murchison.[28] By mixing an asphalt dispersion with a clayey soil, which can often be found in the locality of building, and running the mixture through an extruder, a plastic mass is obtained which can be molded into building blocks. The advantages of this process to quick and easy Army construction in the field are important: little material need be transported (the asphalt suspension comprises only six to nine per cent of the whole), only a light machine is used in the extrusion, and the blocks dry to high strength in 24 hours.

Another interesting war application of bituminous suspensions comes from our British ally.[29] In order to cheaply and lastingly darken light-colored highways, which often serve as guides for invading night bombers, a dilute dispersion may be painted onto the roads, and pulverized coal dusted on before the dispersion breaks.

Various modifying agents are frequently added to improve the properties of these bituminous suspensions. If a slow breaking type of dispersion is desired (as when sand or fine gravel is to be mixed in before applying to a road surface), casein should be added after emulsifying the material in soap water and cooling.[30] Improved adhesion to stone surfaces may be obtained, it is said,[31] by using a small amount of sodium aluminate with the soap solution. Viscosity control methods for soap stabilized bitumen suspensions are also available.[32]

Before leaving this fascinating and fast developing field, we are tempted to glance at a rubber-asphalt road-block, containing ten per cent or more of rubber.[33] The blocks are made by heat-vulcanizing a mixture of a soap-stabilized Mexican asphalt suspension, rubber latex, and vulcanizing agents. Rubber-asphalt mixtures make superior road surfaces,[34] and although the cost is still rather high, we may expect to hear more from this field after the war.

Textiles and Paper

The textile and paper industries are quite familiar with soap and water dispersions in the application of sizes. Sizing is an essential treatment in the preparation of cloths and papers, giving them their characteristic "feel" wearing characteristics, appearance, strength, and ink take-up qualities. A great many sizes are used in suspensoid form, partly to economize and partly because the best application is made in that form. As a modern example, we may cite a dispersion that is said[35] to impart elasticity and suppleness to rayon and silk. It contains 18 parts of diglycol stearate, 15 of stearic acid, 32 of soap, 35 of glue, 8 of gum arabic, 2 of borax, and 15 parts of pepsin.

Wax suspensions, with or without other sizing materials, are often used in treating paper. One such size[36] contains corn oil soap, modified starch, paraffin wax, and water. When incorporated in the beaters, a little alum may be added. This, of course, results in a mixed dispersion of wax and aluminum soap.

Not strictly a size, but of interest at this point, is an emulsion of a non-drying vegetable oil in soap water, to be applied to wrapping paper to reduce its brittleness.[37] This is of especial importance for papers which are used in mechanical wrapping.

The leather processing industry uses soap-stabilized dispersions in many of the stages required to convert raw skins to velvety gloves and tough shoes. Fatliquoring, a process that is essential for suppleness and elasticity, consists of the impregnation of skins with waxes and fats. In order that the oils penetrate sufficiently, they are emulsified with soap and water. Many formulas are available,[38] a more recent one utilizing raw neatsfoot oil, a small amount of the ethylene glycol ether of turpentine, soap, and sulfonated cod oil.[39] Another, for water-wet skins after tanning, is a complex mixture of fig soap, egg yolk, sulfonated neatsfoot oil, oxidized cod-liver oil, sulfonated cod-liver oil, and pine oil.[40] According to P. I. Smith,[41] the method of emulsifying fat-liquors is very important.

Various types of leather finishes and polishes are emulsions or moderately unstable suspensions. A typical neutral shoe cream is said to contain[42] carnauba wax (6%), paraffin (4%), turpentine (15%), water (70%), and soap (5%). The soap acts not only to keep the waxes dispersed, but also to clean the leather. The same writer gives analyses of commercial white shoe creams, which consist essentially of white pigments in soap water. The solid particles here are not fine enough to remain suspended indefinitely, and the cream must be shaken before use, but the same anti-agglomerating (and cleaning) effects of the soap are still acting.

Aqueous dispersions of rubber (natural, synthetic, or reclaimed) find considerable use in the leather industry as shoe cements. The use of shoe cements is one of the most important factors contributing to the lowering of shoe prices, since it eliminates many stitching steps and facilitates various fabricating procedures. The advantages in respect to our enormous military footgear requirements are obvious.

A wide variety of aqueous rubber adhesives have been made, many of them containing soap to stabilize the dispersion and permit better penetration of the fibrous material. One such cement, especially interesting by virtue of its low rubber content, contains 6-9% dispersed rubber, 40-45% of some adhesive thermoplastic material (asphalt, cumar resin, etc.), 1% soap, about 1.3% clay, and the remainder water.[43] Another resin-containing cement consists of paracoumarone or para-indene, a non-volatile mineral oil, and latex dispersed in soap water.[44] A comparatively more available rubber is used in a soap-water-chloroprene dispersion; the chloroprene is first deodorized by shaping with a cheap hydrocarbon solvent.[45]

Reclaimed Rubber

Mention of rubber dispersions brings up the exceedingly important point of reclaimed rubber dispersions. In these days of nation-wide scrap rubber collection campaigns, when every bit of rubber counts toward victory, readers will be interested in a surprisingly little-mentioned method of utilizing scrap rubber—dispersion in water to form an artificial latex which can be handled much like natural or synthetic latices. While our largest rubber consuming industries, such as the tire industry, use coagulated rubber, a significant amount of rubber is used directly as the dispersed, or latex form. Medicinal goods, molded articles, sponge

rubber, electrodeposited items, leather cements, and still other war necessities are usually made from latex. Fortunately for the Allied cause, most of these articles can be made from reclaimed rubber latex, with or without other latices mixed in.

The general manufacturing procedure involves reduction of the rubber particle size in the presence of water and a dispersing agent, usually soap. Other stabilizing agents have been included, such as glue, casein,[46] sodium ferrocyanide,[47] and alkaline solutions of proteins.[48] The rubber is usually plasticized before working with the soap water.

High rubber content latices made with soap tend to be undesirably viscous, leading to difficulty in handling or mixing with other latices. One technologist has claimed reduction of the viscosity by using a soap made in the mixture from a fatty acid and sodium silicate.[49] According to another,[50] the mixing problem may be solved by equalizing the osmotic strengths of the latices by means of a soap solution. The interesting subject of the valuable "Revertex" preparations, which are essentially reversibly-dehydrated, soap-stabilized dispersions of rubber, is too broad to be considered here.

Many readers will be surprised to hear that a not-inappreciable proportion of industrial inks are actually oil-water emulsions stabilized by soap. One such ink, for typographic use, consists of carbon black in a petroleum oil emulsified in a solution of soap in neutralized concentrated waste sulfite liquor.[51] The soap also acts to reduce the viscosity, making the ink suitable for fast presses, and increases the ink's covering power. Another typographic emulsion ink,[52] contains a blue pigment in linseed oil varnish, carbon black, a water-soluble coal-tar dye, water, and a small amount of soap, which is formed by the interaction of sodium hydroxide and the varnish. In still other water-base inks, soap is frequently used to keep the pigment particles dispersed.

Some novel and recent dispersions are worth mentioning. A stiff, pasty emulsion is used in Russia as a car polish.[53] This contains water (16.35%), soap (4.05%), glycerol (6.75%), kerosene (19.3%), dibutyl phthalate (3.55%), and a mild abrasive (50%). The long-awaited no-rub car and floor polish is close at hand, according to H. C. Thompson,[54] who describes a soap-stabilized wax dispersion containing unusual waterproofing and toughening agents. The complicated formula lists carnauba and Japan wax, borax, shellac, water, alkaline casein solution, zinc sulfate, yellow pine oil, and a mixture of potassium, ammonia, and triethanolamine soaps.

An intriguing suggestion has been made quite recently[55] for the prevention of premature abscissions in growing plants. The buds and unripe fruits of many valuable crops frequently fall off, with resultant economic loss. By applying a soap-stabilized wax dispersion containing an auxin (plant hormone), a coating is produced on the plants which permits gradual and continuous absorption of the abscission-preventing chemical, independently of weather conditions. This ingenious device may well prove a significant contribution to the present battle of food production by its easy method of crop increase.

The list of soap-stabilized industrial dispersions has only been "creamed" in this review. The important class of lubricating greases containing soap might well be considered here; similarly with metal polishes, which usually contain soap as an abrasive suspender as well as detergent. Soap has been used as an emulsifier in the preparation of colloidal fuels from pitch, heavy mineral oil, and coal.[56] The many examples presented here are proof enough that soap and soap-stabilized dispersions are playing a role of considerable importance in the present conflict. It is evident also that future scientific research will discover still more industrial applications for this versatile substance.

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53 Uranov, S. A.: Byull. Obmena Opyt. Lakokrasochoin Prom. No. 6, p. 22 (1940.)

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55 Avery, Jr., G. S.: U. S. Pat. 2,284,970 (June 2, 1942.)

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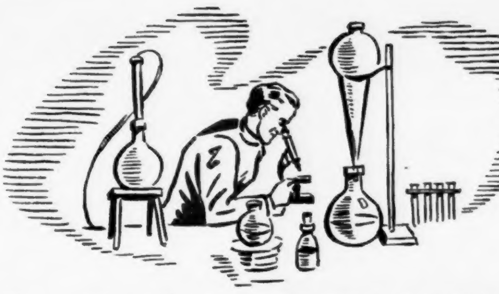
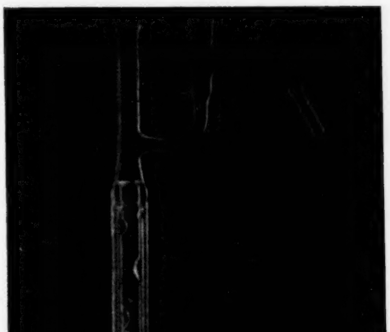


THE LABORATORY NOTEBOOK

Fractionation Column

A compact laboratory fractionation column that is convenient on a bench or where the available height is restricted is described in the current issue of Eastman Kodak's *Synthetic Organic Chemicals.* It consists essentially of three concentric tubes that form a vapor passage, which is three times the length of the column. The center tube is indented in a spiral pattern in order to lengthen the vapor path and to produce better contact between the vapors and the reflux. This tube is an adaptation of the well-known Widmer column, but it is said to be more practical because there are no loose parts which can become broken easily during cleaning or while in use.



A liquid trap is incorporated at the lower end of the second tube. This trap also consists of three concentric tubes, the outer one of which serves as an insulator that tends to keep the low-boiling condensate from being boiled away by the ascending hot vapors. The amount of reflux in the column is regulated by changing the height of the dephlegmator.

The vapors first pass upward between the walls of the outer and second tubes. At the top, they enter the space between the second and innermost tubes, through several small openings, and flow downward. They then pass upward, spirally, through the central tube to the condenser. Condensate from the second and third tubes flows through the liquid trap.

This column can be built in various sizes ranging from the large one illustrated that is 2 inches in outside diameter, for use in 12-liter distillations, to a small size that is 30 millimeters in outside diameter.

Oxidation of Combustible Gases

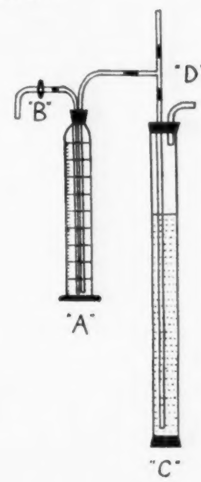
New catalytic method for the oxidation of combustible components of a gas has been introduced by Burrell Technical Supply Co. Complete equipment comprises a catalyst heater, catalyst tube, and copper oxide tube When certain combinations of combustibles are present, complete separation is effected by determining hydrogen and usually carbon monoxide by oxidation over copper oxide and methane and ethane by catalytic combustion. In actual operation the gas mixture is passed two or three times through the tube with the heater at temperature. Reaction products are carbon dioxide and water as with the combustion pipette procedure and the calculations are identical. The new method is said to be faster because of simpler technique and safer through elimination of the hazard of accidental explosions.

Porcelain Filter Candles

Laboratory technicians will be interested in the micro-porous porcelain filter candles with machined metal connectors developed by the Selas Co. The removable all-porcelain candle element can be cleaned by heating to incandescence or washing with acids or solvents, thereby removing bacterial, organic, or inorganic residues. Because the elastic joint between the porcelain candle and the metal connector avoids differential-expansion cracks, the entire assembly may be sterilized in an autoclave with metal and rubber parts attached and ready for use. Porosities range from 03 for bacterial retaining filtrations to XF for rapid activated carbon filtrations.

Device for Constant Liquid Delivery

To deliver liquids at a constant measured rate of flow, Prof. M. Martin Maglio, St. John's University, has used this device. A 500 ml. graduated cylinder, *A*, is fitted with a 2-hole rubber stopper. Lengths of glass tubing, bent at right angles, are inserted into the stopper openings so that the lower ends are nearly flush with the bottom of the cylinder. Glass stopcock, *B*, is connected by means of rubber tubing to one of the right-angle bends and to the reaction vessel.



A large glass tube (preferably 4 feet in length and 2 inches in diameter), sealed at one end by means of a rubber stopper, is filled with water to the three-quarter mark. Into its open end, fitted with a 2-hole stopper, is inserted a length of glass tubing and a short right-angle bend. The graduated cylinder is then connected to bubble tower, *C*, by means of a T-tube, *D*. The free arm of the T-tube is attached to the compressed air line.

To deliver liquid from the graduated cylinder to the reaction vessel, the stopcock, *B*, is first closed. The valve in the compressed air line is opened carefully, permitting the air to bubble through the long column of water in the bubble tower. Then the stopcock is opened to permit the feeding of liquid from *A* to the reaction vessel at a desired rate. Rate per unit time can be read directly from the graduated cylinder.

Fluctuations in pressure in the compressed air line manifest themselves in the bubble tower and not in the cylinder. To adapt the device for individual needs, a smaller or larger graduated cylinder may be substituted for the one described, and an iron pipe can replace tube *C*.

NEW PRODUCTS AND PROCESSES

By James M. Crowe

WINDOWS made of the metal beryllium, which though opaque to light, are more transparent to certain kinds of X-rays than glass, now are used to study the way atoms are arranged. The lattice of atoms that make up the crystals of the metal diffract the X-ray beam. When it falls on a photographic plate there is no longer the single spot which there would be if the metal were not in the path. A symmetrical pattern of spots appears.

This effect is exactly analogous to looking at a distant bright light through a closely woven fabric, such as a handkerchief or umbrella. The fibers of the cloth diffract the light into a similar array of light spots.

These X-ray diffraction patterns tell important facts about the molecular structure of the material being examined, for example, how the molecules are arranged and the distances between them. In the case of various alloys it is possible to check the effect of heat treatment which changes the structure to make the metal stronger and more durable.

According to Zed J. Atlee, of the General Electric X-Ray Corporation, "beryllium is ideal for use in windows transmitting long wave X-rays. The X-ray absorption of the pure metal is less than that of any of the other materials used in diffraction tubes, with the exception of cellophane."

The first beryllium obtained for the purpose proved to be porous, and was therefore unsatisfactory, because it allowed air to leak into the evacuated tube. However, the Brush Beryllium Company was able to supply the metal in extremely pure form, prepared by an electrolytic process. By melting this material in a vacuum, it proved possible to prepare a vacuum-tight disk, which could be sealed into the wall of the tube.

X-rays are produced when speeding electrons are suddenly stopped by a target. Part of the X-radiation produced covers a wide range of wave lengths, and its intensity depends on the power with which the electrons are shot at the target. But also more rays of certain particular wave lengths are generated depending on the metal used as the target. With targets of such materials as tungsten (which have a high "atomic number"), these preferred radiations are of very short wave length, while targets of iron and chromium, for example, result in radiation of much longer waves. X-rays from chromium have many uses, but the Lindemann glass windows of the older tubes would transmit only about 5 per cent while 62 per cent is transmitted by the new beryllium windows. With the shorter wave X-rays from copper, 84 per cent is transmitted by beryllium as compared with 40 per cent for Lindemann glass.

The use of beryllium, Mr. Atlee explains, has permitted other improvements in the design of X-ray equipment for diffraction studies. The thin beryllium disk is soldered to a ring of fernico, and this can be fastened to hard glass. Lindemann glass could only be fastened to soft glass, out of which the tube had to be made. This in turn has made it possible to construct a smaller and more efficient tube than the older one.

Though beryllium, sometimes called glucinum, has previously been used for alloying with copper and other metals, this is the first use that has even been found for it in pure form. It is very light, weighing 115 pounds to the cubic foot. A cubic foot of aluminum weighs 168 pounds. Of metals used for structural purposes, only magnesium, with 109 pounds to the cubic foot, is lighter than beryllium.

Synthetic Gasoline

An alkylation process, developed by the Universal Oil Products Co. for combining isoparaffinic and olefinic hydrocarbons in the presence of hydrofluoric acid to produce an essential and highly potent constituent of 100-octane gasoline, is to be used in more than twenty plants. Some of these plants are already operating.

This alkylation reaction was discovered in Universal's laboratories several years ago but it was not until the war created an enormous demand for fighting aviation gasoline that the process was hurriedly developed to commercial status. Fundamentally the reaction is one of combining propylene, butylenes, and pentylenes with isoparaffins in the presence of hydrofluoric acid. It is said that the toxicity hazard involved with the use of hydrofluoric acid has been overcome by designing and adapting efficient safety equipment and formulating specific comprehensive rules to protect operators handling the acid.

New Phenolic Plastic

The Bakelite Corporation has announced the development of a new phenolic molding material, BM-13017, designed especially for the production of aircraft and automotive ignition parts. The material is natural colored and is well suited for extrusion molding around inserts. Physical and electrical data indicative of the properties of the material are as follows:

PHYSICAL (Molded):

Specific Gravity 1.86 Weight per cu. in. 30.5 g.
Tensile Strength 7,000 lb. per sq. in.
Modulus of Elasticity 10 x 10^5 lb. per sq. in.
Impact Strength—Energy to Break ft—lb. .15
Impact Strength—Per Inch of Notch ft—lb. .3
Impact Strength—Per Inch Square ft—lb. 1.8
Heat Resistance: Not recommended for use where molded parts are to be subjected to temperatures higher than 300 deg. F. (149 deg. C.).
Molding Shrinkage .002-.0035 in. per in.
Flexural Strength 9,500 lb. per sq. in.
Max. Deflection at Center 0.05
Water Absorption Gain 0.10 per cent
Water Absorption Loss 0.10 per cent

ELECTRICAL (Molded):

Dielectric Strength at 60 Cycles 350 Volts per Mil (Inst)
Dielectric Strength at 60 Cycles 300 Volts per Mil (step)
Power Factor at 60 Cycles 0.100
Power Factor at 1,000 Cycles 0.060
Power Factor at 1,000,000 Cycles 0.025
Volume Resistivity 6 x 10^5 megohms cm.
Dielectric Constant at 60 Cycles 7.0
Dielectric Constant at 1,000 Cycles 6.0
Dielectric Constant at 1,000,000 Cycles 5.0

These physical and electrical data have been determined by A. S. T. M. (or standard) samples under A. S. T. M. (or standard) tests.

New Mineral Sources

Continuing its program to find new domestic sources of strategic minerals needed for armaments, munitions and other war materials, Bureau of Mines engineers and chemists have completed successful laboratory investigations to recover chromite, zircon, and garnet from beach sands found along the southwestern coast of Oregon, according to a report made public by Dr. R. R. Sayers, Director of the Bureau of Mines.

The Bureau technologists said that chromite concentrates of more than 40 percent chromic oxide can be produced from the heavy black Oregon sands through a series of complex milling processes. Additional treatment will yield zircon and garnet concentrates of probable commmercial value.

Results of the experiments are summarized and explained in a recently published Bureau report prepared by John Dasher, Foster Fraas, and Alton Gabriel, technologists in the Bureau laboratories at College Park, Maryland. Further investigations are in progress in an effort to separate a usable ilmenite (iron-titanium oxide) concentrate from the sands.

New Solvent

A newly developed solvent was recently described by the Curran Corporation's research director as a volatile, water-white methalated hydrocarbon which evaporates and which is characterized by its quick and powerful cleaning as well as dissolving action on gums, oxidized oils, burnishing oils, etc.

The new product is said to be fourteen times faster than naphtha in cutting gummy and tarry dirt. It is a "non-polar" solvent which it is claimed induces no corrosive or rusting tendency of ferrous metals. The company also says that the product compares favorably with other solvents in toxicity.

FOREIGN LITERATURE DIGEST

By T. E. R. Singer

CHEMIKER - ZEITUNG, CÖTHEN, GERMANY, Vol. 66, 1942.

German Chemical Activities in 1942: Hubert Heinz. Recent chemotherapy of the sulfonamide series. With the present day importance assumed by the "sulfa" drugs, this review on recent German use of sulfapyridine, sulfathiazole, sulfamethylthiazole, etc. is of interest; pp. 6-8. Waeser, Bruno. The de-acidification of waste gas and waste water. This is written from the factory manager's point of view, and relates to the avoidance of pollution of rivers, etc.; pp. 8-9. Friebe, W. New protective lacquers for light metals. Includes lacquers for magnesium and aluminum, and their alloys; pp. 9-12. Lachmann, H. Polyacrylic acid ester in the textile industry; pp. 24-26. Kirchrath, Heribert. The question of protective gases with electric annealing. The use of various gases and mixtures for the prevention of oxidation of metal parts of iron, nickel, aluminum, copper, and their alloys during annealing; pp. 26-28. Wilke, K. Carbon dioxide as fire extinguishing medium in chemical factories; pp. 28-30. Gstirner, Fritz. The production of calcium gluconicum; pp. 31-33. Heinrich, F. and J. Klementz. Protection against corrosion and against acids in the cellulose and paper industry; pp. 43-49. Waeser, Bruno. The use of welding in constructing chemical apparatus; pp. 49-52. Fricke, R. and F. R. Meyer. Easily constructed electric furnaces, made of glass, for temperatures up to 600°C.; p. 43. Stadlinger, Hermann. Technical and industrial use of alkaline cleaning agents. Their use in cleaning metal parts before plating; pp. 66-70. Jayme, George. Recent progress in cellulose and paper chemistry. Including synthetic fibres and paper; pp. 89-94. Matthias, B. A. Measuring instruments; pp. 94-96. Bodenbender, H. G. Chemical research for war purposes. Relates principally to the production and use of substitutes; pp. 100-103.

ZHURNAL PRIKLADNOI KHIMII (JOURNAL OF APPLIED CHEMISTRY, U. S. S. R.), Vol. XV, No. 1-2 (1942), pp. 5-24.

Electrolytic Refining of Nickel: This article gives a systematic survey of the literature on nickel refining, as well as the results obtained personally by N. P. Fedotiev of the Leningrad Chemico-Technological Institute in his experimental work. A study was made of the electrode processes, properties and the role of each constituent of the electrolyte and the process of its refining. Experiments were conducted to determine possible quantitative relations between sodium and nickel salts for various grain densities and temperatures, showing that an increase in grain density makes it necessary to lower the concentration of the conducting salts. Studies were also made on the conductivity of electrolytes used for refining with various correlation of constituents. Additive calculation may be employed very extensively.

BOLETIM DO CONSELHO FEDERAL DE COMERCIO EXTERIOR (Rio de Janeiro) Vo. V, No. 38 (1942), p. 13.

Production and Consumption of Lead: According to the U. S. Bureau of Mines, this country consumed 813,000 tons of refined lead in 1941. The production of refined lead in the United States was 470,517 tons ($53,639,000) in 1941 and 433,065 tons ($43,307,000) in 1940. The United States imports lead ore chiefly from South America (27,173 tons), Australia (19,561 tons), Canada (5,709 tons), and Europe (123 tons). Considerable quantities of refined lead are also received from Mexico.

Vol. V, No. 36 (1942), p. 11.

Consumption of Petroleum Products in Brazil: The consumption of petroleum products in the states of Brazil during the first half of 1942 was as follows:

REVISTA DE AGRICULTURA INDUSTRIA Y COMERCIO DE PUERTO RICO, Vol. XXXIV, No. 1 (1942), p. 73-8.

Vanilla Investigations: Vanilla is a crop of high value per acre and is therefore well adapted to Puerto Rico where land is scarce and agriculture is the most important industry. The average annual consumption of vanilla in the United States from 1932 to 1940 was about 1,100,000 lbs. valued at $2,200,000, which could be supplied by Puerto Rico.

Experimental work on vanilla curing has resulted in the development of a well-controlled scientific process. Curing consists of four principal phases; killing (accomplished by a process of heating), sweating (heating in the sun and subsequent sweating at night), drying and conditioning. New killing procedures, such as freezing, which act more uniformly upon the cell structures thus bringing enzymes into more intimate contact with their substrates, have been applied with success. The irregular heat of the sun curing process has been substituted by electric oven heat by means of which optimum temperatures for enzyme action can be maintained. At the same time oven sweating provides for a more effective control of moisture losses.

Carbon dioxide evolution during the different phases of curing was found to be a measure of the chemical changes which took place in the beans. Killing was found to influence respiration of the fresh beans, thus starting chemical activity. Splitting of the vanillin-containing glucoside was found to start during sweating, reaching a maximum at the end of the conditioning treatment. Vanillin is possibly only an intermediate product in the development of the vanilla aroma since a complete peroxidase-enzyme system acting upon vanilla was found present in the cured vanilla beans.

States	*Gasoline kg.*	*Kerosene kg.*	*Diesel Oil kg.*	*Fuel Oil kg.*	*Lubricating Oils kg.*
Acre territory	90,185	156,989	51,166	.....	6,503
Amazonas	387,645	787,372	648,363	.....	255,180
Para	1,715,217	1,657,776	2,937,017	5,789,458	460,644
Maranhao	529,181	1,199,183	327,069	.....	168,485
Piaui	837,125	804,166	67,448	.....	79,176
Ceara	3,874,096	1,864,007	386,443	.....	264,715
North Rio Grande	1,097,526	989,051	459,422	40,085	123,180
Paraiba	1,785,659	1,533,268	1,449,432	483,534	353,716
Pernambuco	3,725,127	4,298,613	3,393,937	48,051,812	1,334,577
Alagoas	388,733	1,219,148	240,883	103,405	281,157
Sergipe	428,103	819,695	206,558	33,417	205,687
Baia	4,140,252	4,226,699	1,868,201	4,735,577	569,462
Espirito Santo	1,287,074	686,676	430,168	210	213,256
Rio de Janeiro	9,029,320	2,790,714	3,698,991	37,590,334	1,119,128
Federal District	31,333,443	2,599,306	22,269,765	58,180,281	4,296,309
Sao Paulo	81,870,045	8,741,466	16,504,016	73,524,001	8,039,254
Parana	8,419,954	896,149	504,406	.....	590,453
Santa Catarina	4,488,720	923,027	608,327	64,894	496,790
South Rio Grande	19,998,230	5,332,786	7,145,373	2,052,499	2,600,446
Minas Gerais	17,042,237	4,733,685	1,704,496	6,599,480	1,296,492
Mato Grasso	1,661,892	434,207	608,534	.....	175,871
Goiaz	1,631,895	341,148	173,714	.....	57,019
Total	195,785,659	47,030,111	65,685,729	243,248,987	22,987,500

Maintenance Steps to Prolong Instrument Life

By Theodore A. Cohen
Chief Engineer
Wheelco Instruments Co.

INSTRUMENTS have, in recent years, found many and unusual applications in all industries. They are being applied to reduce labor costs in manufacturing processes, to lower fuel costs through exact control, to speed production, and to improve product quality and eliminate spoilage or rejects.

Continued enjoyment of these benefits is dependent, to a large degree, upon proper care of instruments now installed, whether they are doing 24-hour service in defense plants, or normal service in non-defense industries. Shortages of critical materials are necessitating substitutions in components of many instruments, while heavy demands upon manufacturers are slowing delivery of certain types regardless of the priority commanded by the purchaser. Needs of defense industries make delivery of instruments impossible to many other companies wishing them.

Steps that can be taken to prolong the life of industrial instruments, regardless of manufacture, are outlined in this article. This information should be supplemented by careful study of instructions furnished by the manufacturer of each instrument to make sure the equipment is installed and operated according to the manufacturer's recommendations. If such instructions have been mislaid or lost, model and serial numbers of the instruments should be sent to the manufacturer with a request for new instructions.

Centralize Responsibility

All instruments in a plant should be the responsibility of one man, or a group of men, depending upon the number of instruments used. Responsibility for instrument care and maintenance should not be left to the men operating the equipment on which they are installed, as this practice will result in complete lack of maintenance until instrument breakdown, or in unnecessary or harmful tampering by individuals unfamiliar with instrument operation.

Locate Properly

Improper location and improper installation of industrial instruments probably cause more trouble and inaccuracy than fault or failure of the instruments themselves. It is as important that instruments be installed where they can be properly serviced and protected, as it is to install them where the bulb, thermocouple, photoelectric cell, radiation head or other "sensing" unit can reach the temperature, pressure, vacuum or other condition the instrument is to measure.

Eliminate Vibration

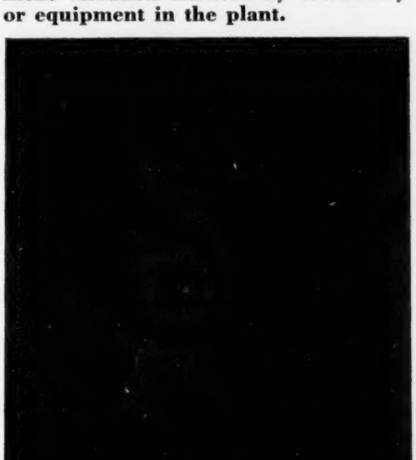
Prolonged vibration, or shock resulting from careless handling, are chief causes of instrument failure. Installing instruments on vibration mounts will minimize the effects of vibration. A better method is to mount instruments in locations where vibration is not present. Instruments should not be mounted upon moving equipment. If instrument panels also carry contactors, these contactors should be removed so that the shock to the instruments resulting from contactor operation is avoided.

Pivots and bearings, particularly of pyrometric instruments, will cause trouble from misalignment or deterioration if the instrument is subjected to sudden shock or persistent vibration. A sudden jar or jolt may crack a jewel bearing, or cause the pivot to jump out of its bearing, while repeated vibration will dull pivots and reduce an instrument's sensitivity.

Protect From Dirt

Next to excessive vibration, infiltration of dirt probably causes most industrial instrument trouble. While instrument movements are particularly sensitive to foreign material that might affect their operation, they usually are provided with dust-proof cases. Such instruments should be opened as infrequently as possible, and then preferably in the instrument shop or in a room where provision can be made to keep the parts clean. The slightest particle of dust or lint caught in the air gap of a millivoltmeter pyrometer, for example, can obstruct the free movement of the coil, while a metallic particle adhering to the pole pieces of the permanent magnet can stop functioning of the instrument completely.

Rubber mounts will dampen instrument vibration induced by machinery or equipment in the plant.



Avoid Excessive Temperature

For best results, excessive temperatures, both high and low, must be avoided at the point where the instrument is installed. An instrument is built to give best operation at room temperature, approximately 70 degrees F., and prolonged use at extreme temperatures will affect the instrument's accuracy.

All instruments are subject to error in measurement if exposed to large changes in room temperatures, since exact compensation for such changes, over large ranges, is uncommon. It is best to mount instruments in locations where minimum temperature changes will occur at the instrument. Instruments should not be subjected to ambient temperature changes larger than 80 degrees F.; for example, from 40 to 120 degrees F. It is preferable, however, to keep the temperature at the instrument as close to 70 degrees F. as possible.

Pyrometers, as well as other instruments, should not be placed where they will be subjected to blasts of heat whenever a furnace or oven is opened. Temperature indicating, recording and control instruments exposed to radiation from a furnace are subject to errors due to differences in temperatures between one side of an instrument and the other. This can result in thermal currents being set up within the instrument, which may produce erratic measuring results.

Corrosion Hazards

Any instrument, regardless of its function, will be impaired if placed in a corrosive atmosphere. Corrosive fumes attack instrument finish, moving parts, measuring systems and may directly result in measuring error and impaired or erratic performance. Special corrosion-proof cases are available for most instruments, but even they do not give absolute protection when the necessity of opening case doors for chart changes on recording instruments, and adjustments to other instruments, is considered. A small compressed air line connected to the case, with an escape provided through a small breather hole in the case, will properly ventilate the case and provide a slightly excess pressure within it to keep out room atmosphere at all times

Corrosive fumes will also attack bulbs, bulb sockets, connecting tubes between bulbs and instruments, thermocouples and lead wires. Painting bulbs and bulb sockets with corrosion-resistant paint will prolong their life. A badly corroded bulb

socket should be replaced to prevent its complete failure and resultant damage to the bulb.

Tubing and Lead Wires

If protection tubing for capillaries of filled-system instruments is damaged, wind it with tape to prevent further deterioration. Carefully remove any sharp kinks in the tubing. If tubing or lead wires run near the floor, build a housing over them or fasten them securely to some solid object where they will not interfere with, or be disturbed by passing traffic. In the absence of metal conduits for protecting capillary tubing between bulb and instrument, wooden strips can be employed to give the same protection.

Lead wires from thermocouples of pyrometers, or sensing elements of other instruments, should be located so they will not be snagged by workmen, passing trucks or cranes. Examine insulation regularly, and take steps to prevent its abrasion. Worn or cracked insulation can be taped, and connections should be checked to make sure they are tight. Locate lead wires away from flames, hot gases, hot pipes and water or oil drips.

Avoid Excessive Moisture

Excessive moisture will often harm industrial instruments. For installations where moisture cannot be avoided, a protecting case should be used.

Do not expose instruments to strong magnetic fields.

When installing or relocating instruments, make sure all connections have been made exactly as specified in the instructions. All connections must be tight and free from dirt and moisture. Clean contacts and terminals often.

Charts for recording instruments should be stored in a cool dry place. Keep charts flat, preferably in their original package, until used. When recording instruments are out of service for any length of time, shut off power to the instrument and remove ink from the pens.

Pressure Instruments

Pressure instruments frequently require special attention as their vital measuring elements usually are exposed to the material undergoing pressure treatment. This material usually fills the measuring system, and may cause trouble unless the installation is properly made.

The material being processed may seriously corrode the element, may solidify in the measuring system at the ambient temperature, or it may deposit heavy tars which would clog the measuring element. Protection from these conditions may be obtained by use of a diaphragm seal mounted below the gauge, with the bourdon tube of the instrument and upper diaphragm housing filled with glycerin.

Fluid pulsation is another cause of inaccuracies and short life of pressure instruments. A rapidly pulsating pressure will destroy the accuracy of the delicate sector-and-pinion movement by wearing the gauge teeth and bearings. A shut-off valve placed ahead of the gauge, and throttled until the pulsation disappears, will overcome this condition, but may result in clogging of this very small opening. Gauge snubbers have been introduced to provide the same result. One type employs a large number of small passageways with changes in direction; in another the inertia of a moving piston prevents rapid pulsation, while a third type employs a rubber diaphragm with the gauge tube filled with glycerin, the latter throttled by passing through a felt retainer.

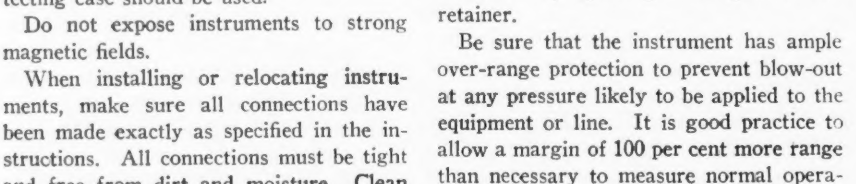
Be sure that the instrument has ample over-range protection to prevent blow-out at any pressure likely to be applied to the equipment or line. It is good practice to allow a margin of 100 per cent more range than necessary to measure normal operation pressures for the equipment.

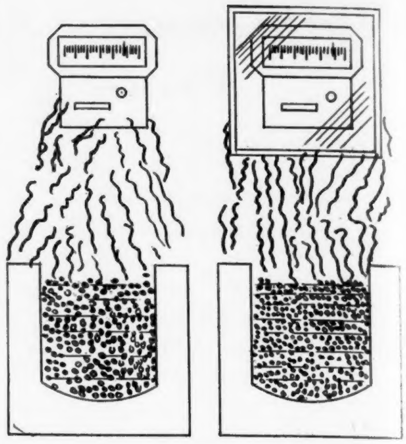
Pyrometers and Thermocouples

While the general information on proper care given earlier applies to pyrometers as well as to other types of industrial instruments, the following suggestions apply particularly to pyrometer-type instruments.

When a pyrometer fails to function properly, the trouble can be traced to the instrument itself, to the lead wire, or to the thermocouple.

Shields should be used to deflect heat radiated from furnaces, ovens or processing equipment. Accuracy of the instruments at the left will be affected by heat radiated from the equipment, while those shown schematically at the right have been given protection. Correct installations of an instrument "sensing" unit is also important. Immersion of the unit at the left in the fluid to the point of the right-angle junction provides conditions conducive to excessive corrosion. Proper installation is shown at the right.





Instruments in corrosive atmospheres should be protected by vapor-tight cases. The instrument at the left will give poor performance and have short life as compared to the instrument protected against corrosive fumes at the right.

First, check connections between the thermocouple and lead wires, and between the lead wires and the instrument. Make sure connections are tight, and that the positive (+) terminal on the instrument is connected to the lead wire running to the positive side of the thermocouple connector head. Check the negative (—) lead wire in the same manner.

Second, move the thermocouple around slightly to determine whether the instrument reading is stable. If the reading is not stable, the thermocouple may be defective.

Several conditions may result in a defective thermocouple. Removal from the heat zone, and disassembly from its protecting tube may reveal one of its wires to be broken; wires to be pitted from corrosion, or wires to have fused due to excessive temperature.

If connections are tight and clean, and if inspection does not indicate the thermocouple to be defective, check the reading of the instrument in service with the reading of a portable potentiometer or a second pyrometer used for test purposes.

Test Instrument Check

First, put the test instrument thermocouple at the same point as that at which the service instrument thermocouple is installed.

Second, if the service instrument reads lower than the test instrument, connect the test instrument to the service instrument thermocouple to determine the millivoltage produced by the service thermocouple.

If the millivolt conversion table for the service thermocouple indicates its millivoltage is correct, the service instrument is defective and should be repaired. Should, however, the service thermocouple millivoltage be low, and the service instrument's millivoltage reading agree with the millivoltage actually produced, as determined by the instrument (with allowance

made for lead wire resistance), the cause of the low millivoltage may be

1. A poor connection in the thermocouple or the thermocouple lead wire;
2. Gases or vapors have caused contamination of the thermocouple, affecting its performance, or
3. Thermocouple or lead wires partially shorted at some point away from the hot junction.

The thermocouple can be checked by measuring the millivoltage at the connector head, rather than through the lead wires at the instrument. In this test, the lead wires must be connected from the connector head, and allowance made for the temperature of the thermocouple head itself. This temperature can be measured with a portable potentiometer or test pyrometer.

If the millivoltage registered by connecting the test instrument (or the service instrument if it was found accurate by previous test) to the thermocouple connector head varies appreciably from the reading obtained earlier with the test instrument thermocouple, the thermocouple is at fault, with one or more of the three reasons given above as the cause. If there is no appreciable variance in the readings, there is a poor connection or a partial short in the lead wires between the connector head and the instrument.

After localizing the trouble in line with the above instructions, the defective part of the pyrometer hookup—thermocouple, lead wires or instrument—can be readily replaced or repaired.

Thermocouple Repair

Damaged thermocouples can often be repaired so they can be used for their original application, or for some other application. Many thermocouples that have given way at the hot junction can be made usable by cutting off the damaged part and welding a new hot junction.

When repairing a thermocouple, or making a new one, cut both wires comprising the thermocouple to the same length. Prepare a good contact to the circuit by removing oxide from one end of each wire for a distance of about one inch, using a grinding wheel. Fasten the wires in a vise, or hold them securely in some other manner, and twist the unground ends together so that there are at least three turns of the wire.

Use an acetylene torch to weld the ends, selecting a torch tip in proportion to the size of the wire to be welded. For the smallest gauge wires, use a No. 1 torch tip, and for the largest gauges use a No. 10 tip. Fasten the torch in a vise so the flame will be horizontal. Adjust the torch so as to get a neutral flame about four inches long, with the white cone that surrounds the blue cone about ¾-inch long.

Hold the twisted junction of the wires in the flame at the tip of the white cone until both wires are a bright red; then dip in a fluxing mixture consisting of six parts of fluorspar to one of borax. If fluorspar is not available, borax alone may be used. Place the flux-covered twisted ends in the flame immediately. Since one wire melts at a lower temperature than the other, manipulate the weld in the flame so both wires reach their melting points at about the same time. This can be done by keeping the wire that melts first in the cooler part of the flame until the other wire is about to melt. As soon as both wires reach the melting point, remove the weld in the flame until both metals flow together to form a ball weld at the tip. Use a moderately hot flame to avoid burning.

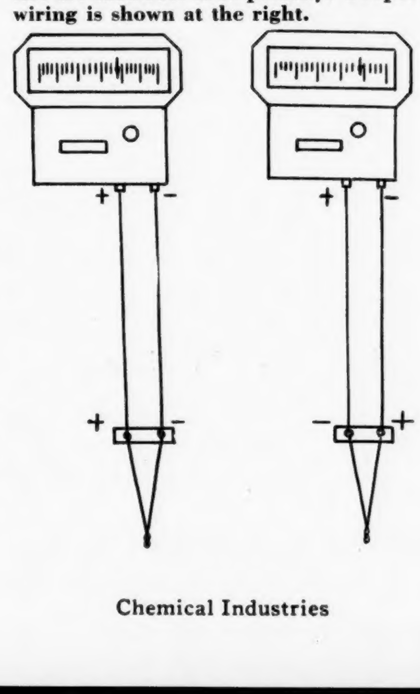
The weld should be made, if possible, at the first attempt. Continued heating at welding temperatures will result in a poor weld. If a good weld is not made promptly, and a shorter thermocouple can be used, cut off the ends, make a new twist, and repeat the procedure.

Protecting Tubes

No thermocouple will give maximum service unless it is properly protected. The protecting tube used is as important to the installation as the thermocouple. The tube should be carefully selected to meet all the conditions to which it will be subjected in protecting the thermocouple from injury.

Protecting tubes must themselves be protected against conditions which might cause them to fail. The manufacturers' data on various types of tubes should be checked carefully. After the tube is installed, it should be inspected frequently and replaced before it can fail and permit injury to the thermocouple. Cast-iron tubes used in aluminum and die-cast metals should be painted with whiting daily.

Lead wires of the instrument at the left are incorrect as to polarity. Proper wiring is shown at the right.



When a load is being placed in a pot or furnace, care should be taken that the protecting tube is not damaged. Protecting tubes become soft at high temperatures, and any bending of the tube will break the porcelain insulators which surround the thermocouple itself. The thermocouple wires coming in contact with the protecting tube may become contaminated or damaged.

Porcelain protecting tubes will not withstand shock and should be handled with great care. In those cases where porcelain protecting tubes are used in molten baths, the tube always must be removed before the bath is allowed to solidify. Never introduce a porcelain protecting tube into a heated furnace. Thermal shock may cause it to fracture. Put the tube in when the furnace is cold, and bring it up to temperature with the furnace.

Thermocouple Immersion

Three factors control the temperature of a thermocouple.

1. Heat conduction and radiation to the couple from the hot medium. This factor, which should be as high as possible, is limited by the medium being measured and the protecting tube insulation.
2. Heat conduction from the couple tip. The protecting tube and the thermocouple both conduct heat from the tip. The thickness of the protecting tube should be small compared to its immersion in order to make this factor low.
3. Heat content of the couple itself, determined by size of the wire. Lighter couples will have faster response, but correspondingly shorter life.

If a thermocouple is in a muffle, or atmosphere-controlled furnace, 30-inch immersion may be insufficient to obtain true readings, while 5-inch immersion may be sufficient in a molten salt bath. A method of testing is to "explore" the inside of the protection tube with the bare thermocouple. If, by pulling the couple out one inch, the temperature indication does not change, it may be assumed that the immersion is sufficient to obtain a true reading.

A correct temperature reading usually is not necessary. For control purposes, it is sufficient to have the couple in a position so that it will have a definite temperature relationship to the furnace. This relationship should be constant. The couple should be placed so that it will "sense" changes of input as rapidly as possible, and it should also be in a turbulent portion of the hot medium in order to decrease heat lag.

Thermocouples will give best service if kept clean. When thermocouples are used without protecting tubes, they should be cleaned daily. All thermocouples should be inspected frequently.

PLANT OPERATIONS NOTEBOOK

By W. F. Schaphorst

WHENEVER this writer passes a chemical plant having steel chimneys instead of brick, emitting good heat out into the atmosphere, he is reminded of a unique heat-saving method that has come to his attention. It is a method that could probably be advantageously copied by many a chemical plant. It provides ventilation for the factory during summer months and helps with the heat load during winter months.

"Too much of our heat goes up the chimney," is a complaint that we all have heard all our lives. Many attempts have been made to utilize that heat, or to reduce it to an absolute minimum. Some of the attempts have been successful while others have not been so successful. Some have failed, utterly.

The chimney in this particular instance is made of steel, and steel is a good conductor of heat. The outside of the chimney is therefore "hot" most of the time while the boilers are in operation. To utilize the heat that passes through the chimney shell an enclosed air space has been built concentrically around the stack to a height of two stories, and, of course, the air within the enclosed space becomes warm. During the cold winter months that warm air is forced by means of fans to various parts of the factory. It is said that satisfactory heat conditions are now the result in portions of the factory that were formerly heated with difficulty.

During the summer months a ring covering the enclosed air space is lifted. The heated air then passes upward into the atmosphere, creating a natural draft which in turn is made to draw cool and fresh air into the boiler room.

This novel development appears to be a step in the right direction. A considerable percentage of the heat that would otherwise be wasted is now saved or is compelled to do useful work.

During these days of fuel scarcity it is important to save as much of it as possible. The above-mentioned enclosing chambers can be built of materials that are not urgently needed in the war effort. Some metal might be necessary, but by exercising American ingenuity it is quite possible that no metal at all would be needed.

Length of Coils

Many articles, today, come either in rolls or coils—paper, hose, belting, cables, chains, rope, wire cloth, wire, canvas, insulating material roofing, sheet metal, etc. —and the question often arises, "How much material remains in that roll?" Or, "Does the original coil contain full length?"

There are numerous formulas for computing lengths in rolls and coils, but I find that all of them are more or less complicated. We are told to find the outside diameter, the inside diameter, then subtract, multiply, and do various other things, and finally we get the answer.

Here is a simple rule of my own derivation which I contend is the simplest possible: Make the one measurement "S" as shown in the sketch herewith, in inches. Then count the number of turns. Multiply the two together and then multiply that by 0.2618. The result is the length of the roll in feet.

If it is a coil instead of a roll, go at it in precisely the same way and use the same figures as above.

For example, if the distance S is 10 inches, and the number of turns is 10, the roll or coil contains 26.18 feet.

This holds true regardless of whether the material is paper, leather, rubber hose, or anything else. The thickness of the material or the diameter of the hose does not make any difference.

To check the rule, take an instance where we have only one single turn of the distance S being 10 inches. The coil then, is a true circle, and the distance S is the diameter of that circle. The length of the hose, of course, is equal to the diameter times 3.1416 or 31.46 inches. Now divide that by 12 and you will get 2.618 feet, as per the above rule.

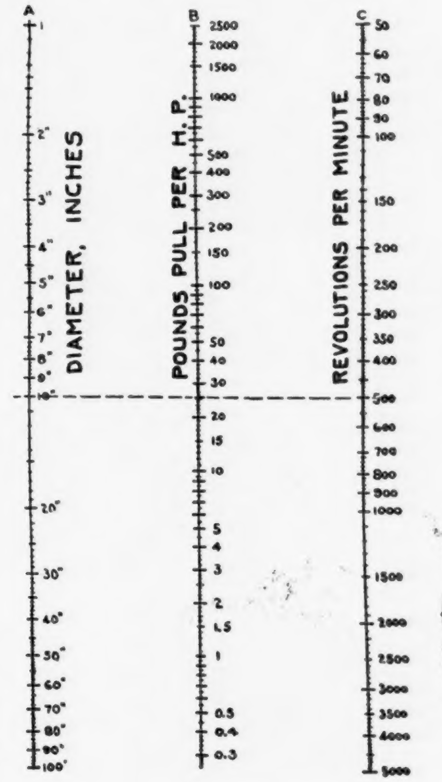
Even if the roll or coil is so tightly wound that there is no visible hole through it, the rule still holds true. And, ditto, if it is loosely wound.

Belt Drive Chart

Here is a handy chart for the chemical plant operator for quickly solving a multitude of problems that are more or less vexing or time-consuming. All you have to do is—lay a straight-edge across the chart and there's the answer in the middle column.

For example, you want a chain for a 10-inch sprocket running at 500 r. p. m. to transmit one h. p. How strong must the chain be?

The dotted line drawn across the chart shows how it is done. Connect the 10" (column A) with the 500 (column C) and column B gives the answer immediately as 25.2 pounds. If you want a chain that will transmit 10 h. p. you merely multiply 25.2 by 10, which gives 252 pounds as the necessary strength.



If you are designing a belt drive the chart can be used in the same way for determining the "effective pull"—which is the difference in tension between the tight and the slack sides.

For gear drives the "push" is found in the same way. In other words, if the diameter of the pitch circle is 10" and the gear is to make 500 r. p. m., the tooth must have a "pushing strength" of 25.2 pounds for each horse power to be transmitted.

In other words, this chart can be applied to a wide variety of drive problems including flat belts, V-belts, chains, ropes, cables, gears, etc.

Fuel for the Flying Fortresses

Shipped in CROWN DRUMS!

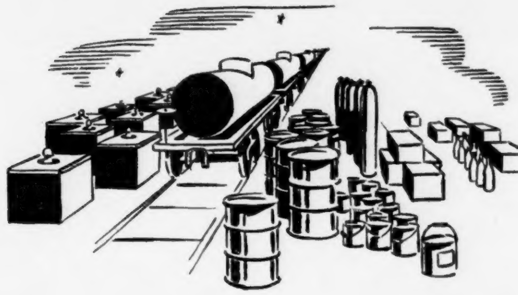
You can't solve a fuel shortage in the Southwest Pacific by building a pipeline. Fuel for the Flying Fortresses, for the tanks, the jeeps, for all the mechanical equipment must reach the remote outposts in drums . . . and in drums that can take a drubbing.

We don't know just where the *Crown Drums* we supply to many oil companies will go. We couldn't tell you if we did. But we do know they are carrying high octane gas . . . and regular gas and oil to plenty of those places with the unpronounceable names where the Army, Navy and Marines are operating.

Just another instance of how *Crown* is helping to win the war . . . by sending its regular products to the front . . . as well as by making special products for the Army and Navy.

CROWN CAN COMPANY, PHILADELPHIA • NEW YORK • *Division of Crown Cork & Seal Co. • Baltimore, Md.*

★ ★ CROWN CAN ★ ★



PACKAGING & CONTAINER FORUM

By Richard W. Lahey

Chemical Containers for the Duration*

ALL chemical producers are greatly concerned about how they are going to get their products into consumers' hands if the present shortage of containers continues to become more acute. A reconsideration of the happenings of the past year and a half may indicate what we have to look forward to. Let us just recall these events before we forecast what we will have to face this year.

1. Steel Drums: About eighteen months ago there were indications that difficulties were ahead. Government was casting around for means of coping with the impending shortage. The M. C. A. Standardization Committee recommended and were successful in getting the industry to standardize on 5 gallon and 55 gallon single trip steel drums for liquids. They also standardized on 55 gallon returnable drums except for the 110 gallon drums for Aqua Ammonia and the 20 gallon drums for hydrofluoric acid.

Drum users started to look around for non metallic substitutes, but little progress was made. This situation continued for about 6 months, with government and industry making little progress. During this period, the Containers Branch of the W.P.B. came into being. This Branch consulted with the drum fabricators. An advisory committee of steel drum manufacturers was organized by the Containers Branch who proved to be of considerable assistance in their efforts to cope with the situation. They did not, however, have the assistance of those individuals in chemical companies who have an intimate knowledge of steel containers and possible substitutions.

Conditions reached the point where light gauge drum plants operated by chemical companies were unable to get sufficient steel to fabricate enough drums to pack their production of caustic soda, etc. Drums fabricated by drum manufacturers were becoming more difficult to obtain, and in May, the Chemical Branch of the W.P.B. became so concerned about this condition that they appointed a containers section in their branch to help chemical companies solve their container problems. Donald C. Knapp was put in charge of this activity. His has been a grueling and thankless job and it is certain that if it had not been for his cheerful and earnest cooperation our industry would have been in an even more chaotic condition. Among other duties, he has the responsibility for making known to the Containers Branch, the requirements of the Chemical Industry and passing on possible substitutions.

Before the war, containers were fabricated from continuous hot mill sheets and cold reduced sheets. By the first quarter of last year, users were glad to have drums fabricated from hand mill sheets and more recently, Bessemer steel, annealed to eliminate excessive stiffness has been used.

Limitation Order L-197

Limitation order L-197, issued last fall, prohibited the use of steel containers for packing a long list of products. Shortly thereafter, allocation order M-255 was issued and which required W.P.B. approval and rating on all orders for steel drums.

* EDITOR'S NOTE: *It is hoped that the article "Chemical Containers for the Duration" will be of some assistance to shippers in making their future packaging plans. Substitute containers should be developed as quickly as possible for those packages where future or current shortages are evident. This insurance is necessary if continuity of shipments is to be maintained.*

It has been indicated that there is enough steel to furnish containers for only the essential uses during 1943, and that if substitutes can be used they should be; and care should be taken of existing steel drums so that they may be re-used a great many times. We do know that it is difficult to purchase drums, new or used, and there are no prospects of improving this condition.

In the spring of last year, chemical companies changed their sales arrangements and maintained title to the drums which they formerly sold with their products. These single trip drums, which are now serving as returnable containers, are enabling chemical companies to maintain shipments. These drums are not constructed for returnable service and their life expectancy is necessarily short. When these containers are no longer serviceable, tight barrels will have to be substituted and it is questionable whether the cooperage industry will be able to cope with the requirements.

The W. P. B. has indicated that these drums should not be returned empty over long distances. Shipments of empty drums from the east to the west coast may be traded to a west coast chemical producer, and in a like manner drums shipped filled from the west to the east might be given to the eastern shipper. The W.P.B. is trying to work out this plan.

2. Carboys: The demand for carboys was so great in the winter and spring of 1942 that the facilities of glass bottle manufacturers were severely taxed. By almost superhuman efforts, plus a substantial investment in equipment to expand production, the supply of bottles was brought above the demand. At present, there is a plentiful supply of bottles, but boxes and cushioning materials are becoming very difficult to obtain.

Some of the liquid products which can no longer be packed in steel containers, are now transported in carboys. It is believed that the demands for carboys will continue to increase. If it develops that the supply of tight barrels is not adequate to take care of the expected demands, it may create requirements for carboys that cannot be supplied.

3. Wooden Boxes: The supply of wooden boxes was adequate until the last few months. It is believed that this shortage is partially due to a combination of conditions, such as shortage of labor and increased Government demands for wooden boxes to replace fiber boxes which did not prove satisfactory for overseas shipments. The recent development of the solid fiber boxes known as V-1 that have given such a good account of themselves in water submersion and other tests, may help to relieve this situation. Several publicity releases, warning industry of impending shortages, can only be interpreted as danger signals.

4. *Slack and Tight Barrels*: There is a good deal of conflicting information about the supply of these containers. Barrel Coopers and the Cooperage Association have assured industry that there is an adequate supply of both types of barrels. On the other hand, steel allocations for hoops have been cut, and there is some talk in Government circles of an impending shortage of stave and heading stock. It appears that the labor shortage will be felt more severely by the stave and heading suppliers because that type of labor has been on a comparatively low wage scale. Probably, the recent W.P.B. limitation order on paper for civilian packaging which has been caused by an expected 20% reduction in the supply of pulp wood for the manufacture of paper may be taken as an indication that the supply of cooperage stock will be gradually reduced.

5. *Fiber Drums*: Manufacturers of these containers were successfully taking care of the demands until order L-197 increased this demand beyond the manufacturing capacity for these drums. Manufacturers cannot take any more new business and they require about 3 months minimum time for delivery against their regular customers' business. Production of those containers which have steel heads may be curtailed by the W. P. B. There are several new fiber containers which are in the process of development or which have just been offered to the trade. In addition some of the old line manufacturers may be able to provide extra production equipment. It therefore appears that there will be increasing quantities of fiber drums available with an unsatisfied demand ready to gobble up any added production.

6. *Textile Bags*: Shortages of cotton cloth and burlap have led to the latest conservation order (M-221) which curtails sale of new burlap bags by 50% and restricts their use to chemicals (other than fertilizer) and certain specified animal and human foods. The restrictions on cotton textile bags in order M-107 is continued in force by amendments. No restrictions have been placed on second hand bags other than to require that when delivered they are to be reconditioned, including darning of holes and tears.

7. *Paper Boxes and Bags*: There has been no shortage of paper boxes or bags up to the present time. In 1941, we were led to believe that shortages were developing, but fortunately, this false scare passed over quickly. Recent publicity releases such as the data previously referred to, about a 20% reduction in the supply of wood pulp in 1943 and the limitations which prohibit use of paper containers for liquor bottles, certain gift wrappings, etc., are intended to insure that paper will be available for multiwall paper bags, paper boxes, and other packaging requirements. It is believed that there will be a plentiful supply of paper for these purposes.

8. *Steel Cylinders for Compressed Gases*: In addition to the shortage of steel, the cylinder fabricating capacity is not sufficient to take care of the demands. The W.P.B. has indicated that it is necessary to increase the turnover of cylinders by seeing that gas users have in their possession not more than their immediate requirements. It has also been indicated that unessential uses of cylinders should be eliminated. There is little hope of a more plentiful supply of cylinders being available in the near future.

This review leads one to the opinion that we should not depend on obtaining many new steel containers this year. It appears that wooden boxes and barrels may be increasingly hard to get. Carboys and textile bags are at present obtainable in reasonable quantities depending on the products to be packed and the priorities attainable. The supply of fiber and plywood drums cannot be counted on to increase unless new productive capacity is installed.

Paper is the only container fabricating material that has been available in adequate quantity. If present indications of a shortage develop, the Chemical Industry, as well as others, will have nothing to turn to for container substitutes. Some worthwhile developments of adhesives which are water proof, resins which provide high wet strength to paper, improved water resistant sizing of paper, and new water vapor resistant coatings, are the preliminary steps in an intensive effort to provide paper with needed qualities which will make paper containers acceptable as substitutes.

It is hoped that the W. P. B. will profit from last year's experience and take appropriate action to provide as much paper as is required for containers for the Government and for essential civilian purposes. It is also suggested that the W.P.B. encourage and stimulate the development of chemical or other paper treatments to further improve its acceptability as a substitute for wood, textiles and steel.

Containers Given High Rating

In order to assure adequate distribution of shipping containers for the packaging of military and civilian products, producers and shippers of military combat equipment, Lend-Lease materials, foods, and many other essential items have been assigned high preference ratings for the procurement of shipping containers.

Order P-140 issued Feb. 24 benefits a number of industries, and assures containers for the shipping of important products. Included among those aided are farmers, manufacturers, tobacco processors, flour millers, bottlers, textile mills, chemical plants, meat packers, fishermen and others.

The order covers all outer wooden containers which are made from lumber, veneer, plywood, or staves, and outer shipping containers which are made from corrugated or solid fibre. It also includes parts such as shooks, cleats, staves, veneer, plywood, corrugated or solid fibre which are cut to size for these containers.

Under its provision, preference ratings are assigned for the procurement of shipping containers according to the importance of use.

The ratings and the containers to which they may be applied follow:

AA-1 for containers for U. S. military combat items such as aircraft, ammunition, armament and weapons, tanks, vehicles, emergency rations, certain canned foods and medical supplies.

AA-2X for containers for other military items, for Lend-Lease products, for export shipment, and for foods set aside for purchase by government agencies under Government order.

AA-3 for containers for the products specified on List 3 of the text of the order.

AA-4 for the containers for the products on List 4 (consists of a number of chemical products).

AA-5 for the containers for the products on List 5.

For further details and complete lists of the products involved readers should get a copy of Order P-140 from the nearest WPB office.

L-197 Amended

The expected revision of Limitation Order L-197, which restricts the use of steel drums, became effective on January 29th. As this order is of utmost importance we suggest that all readers obtain a copy by writing to the WPB for a copy of Limitation Order L-197, as amended Jan. 29, 1943.

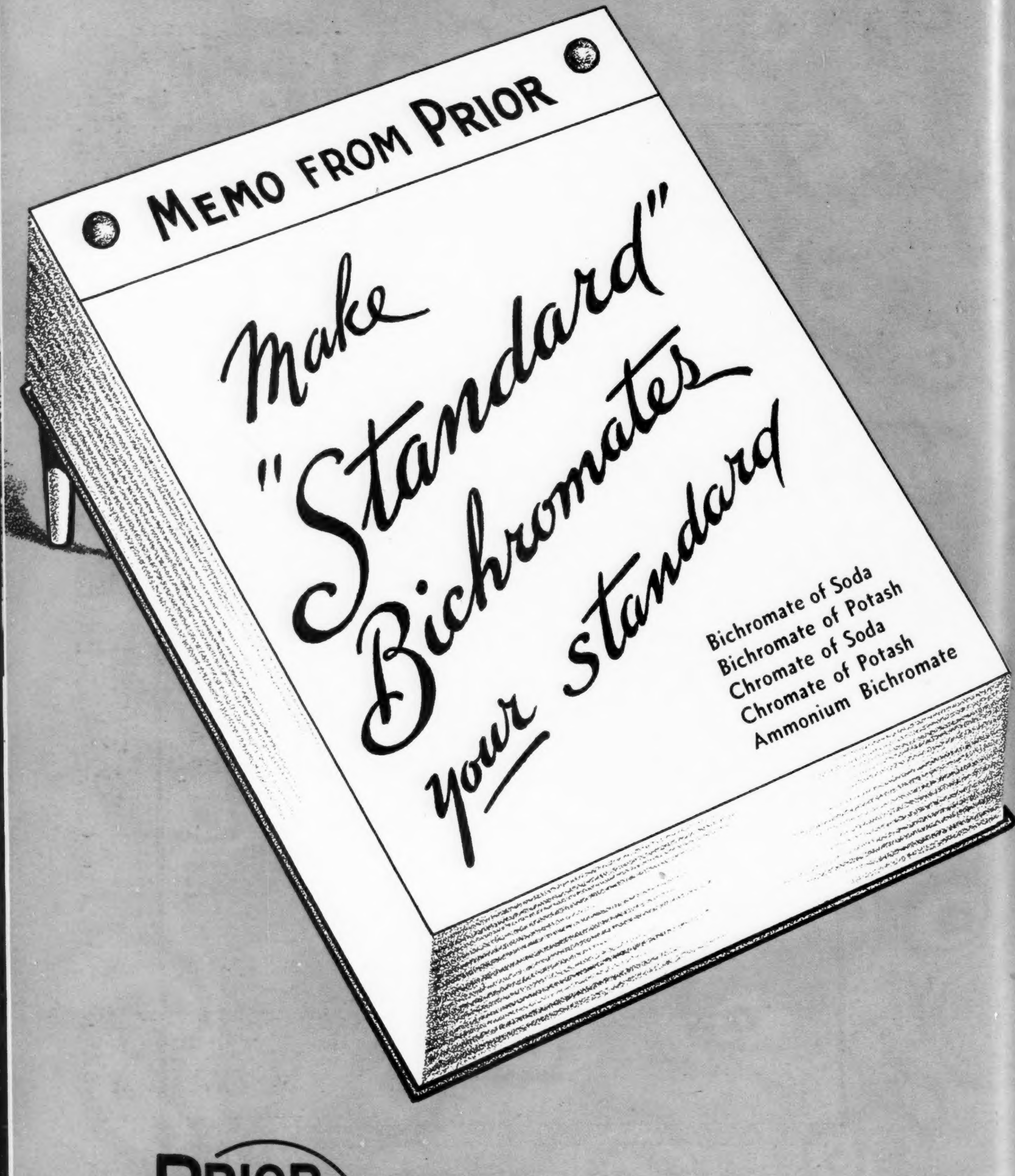
The regulation prohibits, or limits, use of steel drums to those on hand, for packing a total of 175 products and/or classes of products. Its important features are as follows:

1. Removes all restrictions on packing in steel drums certain acetates, alcohols, phthalate esters, chlorates, etc. These are mostly thin penetrating liquids.

2. Drums heavier than 14 gauge are exempt from restrictions.

3. Used drums lighter than 23 gauge and larger than 30 gallons in capacity are also exempt.

4. Additions to the lists prohibiting use of steel drums include ammonia and potash alum, sodium aluminate, ammonium nitrate, etc.


MEMO FROM PRIOR
Make "Standard" Bichromates your standard
Bichromate of Soda
Bichromate of Potash
Chromate of Soda
Chromate of Potash
Ammonium Bichromate

Headliners in the News

Medallists . . . To Dr. Conrad Arnold Elvehjem, left, professor of biochemistry, University of Wisconsin, the Chicago section of the American Chemical Society has awarded the 32nd Willard Gibbs Medal, founded by William A. Converse, highest award of international scope which the Chicago section of the American Chemical Society can bestow.

Right, Dr. Charles Glenn King, visiting professor in Columbia University, who received the 1943 Pittsburgh Award of the Pittsburgh Section of the American Chemical Society for outstanding achievement in chemistry. Both awards were made for meritorious work in nutrition.

Nichols Medal . . . Professor Arthur B. Lamb, dean of the Graduate School of Arts and Sciences of Harvard University, has received the 1943 William H. Nichols Medal of the New York Section of the American Chemical Society. Professor Lamb was cited by Professor William C. MacTavish of New York University, chairman of the jury of award, "for his investigations in inorganic and physical chemistry, leadership in defense against poison gas, and as a teacher, administrator and editor."

Honored For Long Service . . . Associates who have served McKesson & Robbins, Inc., for 25 and 50 years receive service buttons, bronze plaques and scrolls from W. J. Murray, Jr., president. At ceremony in president's office (left to right) William H. Bowden, assistant export manager, who has served 25 years; John T. Stebe, vice-president in charge of export, 50 years; John Valdes, salesman for Spain and Portugal, 25 years; Mr. Murray; and Marcelino Munoz, Spanish and English correspondent and claim adjuster, 25 years.

Appointments . . . International Minerals & Chemicals Corporation has added two men to its Amino Products Division. At the left is Dr. M. J. Blish who has been appointed chief of the Research Laboratory. Dr. Blish was chief of the Protein Division, Western Regional Research Laboratory, U. S. Department of Agriculture. Since 1930 he has also been Editor-in-Chief of "Cereal Chemistry." At the right is Ralph W. Shafor who is well known in the beet sugar industry, where for the past thirteen years he has been manager of the beet sugar division of Petree and Dorr Co., and was formerly with Great Western Sugar Co.

Record Attendance at DCAT Dinner Hears Reynolds

The Drug, Chemical and Allied Trade Section of the New York Board of Trade held its 18th annual dinner, March 4, at the Waldorf-Astoria. Proceeds from more than 2,200 reservations were donated to United Seamen's Service, following a policy begun last year that a worthy charity be selected as a beneficiary of the dinner.

Above, Banquet scene, looking toward the dais, where distinguished guests and members were seated. At the left, Senator Robert R. Reynolds of North Carolina, Chairman of the Senate Military Affairs Committee, who spoke on the problem of manpower for military and war production needs. Shown with Senator Reynolds is Victor E. Williams, Chairman of DCAT.

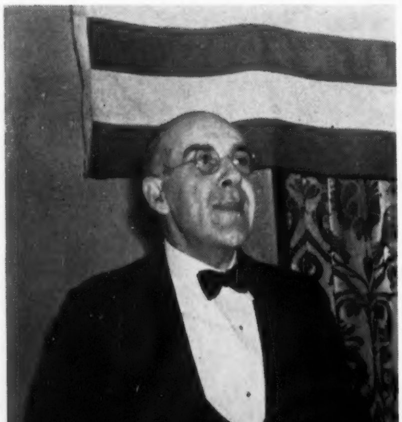
Among the guests and members at the speakers table were: Above, left to right, John C. Ostram, Secretary of DCAT; Philip M. Dinkins, member of Advisory Council; J. W. Raynolds, War Production Board; Robert B. Magnus, Treasurer of DCAT; F. J. McDonough, New York Quinine & Chemical Works and a Director of the New York Board of Trade; August Merz, president of the Synthetic Organic Chemical Manufacturers Association. Below: Floyd N. Dull, president of New York Board of Trade; Ralph E. Dorland of Dow Chemical Co. and director of New York Board of Trade; John J. Toohy, Office of Price Administration and formerly with E. R. Squibb & Sons; George Van Gorder, first vice-president, McKesson & Robbins and president of National Wholesale Druggists; William D. Barry, Mallinckrodt Chemical Works and member of Advisory Council; Leo G. Ryan, President Proprietary Association of Canada, and Percy C. Magnus of Magnus, Mabee & Reynard.

TAPPI

The Technical Association of the Pulp and Paper Industry held its 28th annual meeting, February 15 to 18 in New York City. A feature of the meeting was the annual TAPPI luncheon at which Prentiss M. Brown, Administrator of the Office of Price Administration spoke and at which Harry Fletcher, Fletcher Paper Co. and first president of the association, was presented with the TAPPI Medal by Robert B. Wolf, Weyerhaeuser Timber Co. In the photograph, left to right, Prentiss Brown; Ralph A. Hayward, president of TAPPI; Mr. Fletcher; and Mr. Weyerhaeuser.

N.J. Section A.C.S.

At a meeting of the N. J. Section of the American Chemical Society in Newark, N. J. on Feb. 8, Dr. Per K. Frolich, president of the A. C. S., along with W. J. Sparks and R. M. Thomas, all of Standard Oil Development Labs, presented a discussion and demonstrations of the various synthetic rubbers and materials involved in the synthetic rubber program. Both the emulsion and low temperature polymerization processes were demonstrated.



S.C.I. - A.I.Ch.E.

A meeting of the American Section of the Society of Chemical Industry, jointly with the American Institute of Chemical Engineers, was held on February 19, in New York. The subject of the evening was "Foods in War and Peace." R. S. Hollingshead, left, Chief of the Agricultural Chemical Research Division, U. S. Department of Agriculture, spoke on dehydrated foods while E. T. Gibson, right, President of Frosted Foods Sales Corp., presented the case for quick frozen foods.

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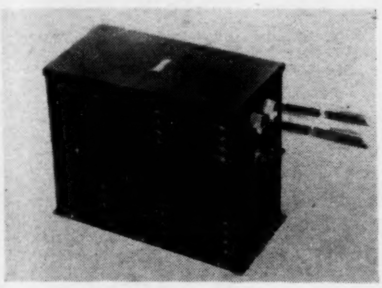
Sugar
Ambassador for a thousand products
The wholesaler's salesman is the ambassador for yours and 999 other products. This does not permit him to push them all.
Hence, the manufacturer must win retailer support for his own product. In accomplishing this end, Bemis Deltaseal Bags have an outstanding record.
Their colorful brand printing adds eye appeal. Their handy pouring spout wins quick consumer preference. Their square ends make them easy to stack on shelves or in mass displays. Hence, retailers get behind products packed in Bemis Deltaseal Paper Bags.
BEMIS
Deltaseal
BAGS
PULL
CUT
POUR

NEW EQUIPMENT

Voltage Stabilizer QC229

General Electric has announced a new voltage stabilizer which provides a constant output of 115 volts from circuits varying between 95 and 130 volts.

This stabilizer is said to be insensitive to load power factor. It is not affected by variations in load from no load to full load or by changes in power factor from unity to 0.8 lagging. It is completely self-protecting, and will operate continuously throughout the range from open circuit to short circuit without damage.



The new stabilizer can be applied wherever close voltage regulation is important to good operation—electronic-tube apparatus, X-ray machines, photocell equipment, and in the calibration of meters, instruments and relays. Ratings from 50 va to 5000 va are available.

Air Power Stacker QC230

The Lewis-Shepard Sales Corporation has developed a portable elevator for use in connection with various hazardous operations. In offering this type of stacker with air power motor Lewis-Shepard state that it is safe, fast and efficient in all explosive atmospheres.

Powered by an air motor this stacker will operate at the same air pressure and volume as industrial overhead air hoists.

These air power stackers are produced in the same speeds and capacities as the standard Lewis-Shepard line of electric powered stackers; also in standard hinged and telescopic types.

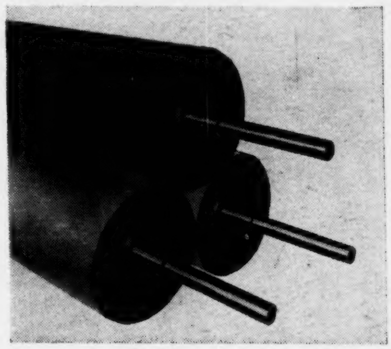
Pump with Removable Liner QC231

Blackmer Pump Company has just announced the start of production on a rotary pump with an improved removable liner, according to information released by the company.

This new pumping unit operates on the same "bucket design" (swinging vane) principle as other Blackmer pumps, but it is so constructed that, when wear finally affects the capacity of a pump, the old liner may be easily removed, and a new one set in place. The replacement operation involves only the removal of the pump heads, driving out the old liner and inserting a new one. The company states that this quick replacement feature is important for pumps handling corrosive or mildly abrasive liquids, where pump life is normally very short.

Wood Stave Rolls QC232

These light weight, wood rolls, pictured here, were developed by Rodney Hunt Machine Company as an improved construction to meet the special requirements of several industrial firms.



The illustration shows one size, 12" diameter x 88" face. In this case, the three rolls are identical except that the two lower rolls are covered with a spiral wound webbing to provide greater "pull."

To save weight and reduce cost, the usual cast iron spiders are replaced with a series of wood heads. These in turn are anchored securely to the through shaft by means of patented "Shaf-tite" construction. This employs a special flange designed for light weight but greater strength.

For light duty carrier roll uses, this wood drum construction is supplied in most any diameter from 12" and up.

Combination Coolant Pump With Tank QC233

The Eastern Engineering Company has announced the introduction of a new portable coolant pump, known as Model 16-S Pump with Tank.

It is designed for use on lathes, shapers, milling machines, drill presses, grinders, cut-off saws, tappers, and in other applications where a steady stream of coolant or cutting oil is necessary.

The following general description of the unit is given by the company. Tank size—16" long x 10" wide x 9" high. Motor height above tank—4¾". Weight—40 lbs. Motor—1/30 H.P., 1525 RPM, air jacketed, fancooled, totally enclosed motor for operation on 110 volt, 60 cycle, 1 phase current. Type pump—centrifugal.

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NEW YORK, N. Y.

BOOKLETS & CATALOGS

Chemicals

A478. *Coatings.* Methods for "Increasing Water Resistance of Polyvinyl Alcohol Coatings" after they have been deposited from water solution are described in the technical bulletin. Use of water-soluble thermosetting resins, drying oils, and certain chromium compounds for this purpose are investigated. Electrochemicals Dept., du Pont de Nemours.

A479. *Electrolytic-tin Plating* to conserve tin tonnages is discussed on The Chemist's Page in Feb. issue of *The Crown.* Crown Cork and Seal Co.

A480. "*Lead.*" Use of lead as protective coating on iron and steel, of lead arsenate to slow the spread of Japanese beetle, and of lead as substitute for other metals in WPB's War Housing Manual are summarized in recent issue of the publication. Lead Industries Assn.

A481. *Plastics.* Engineering properties—mechanical, thermal, optical, electrical, molding, and miscellaneous properties—of Lucite, Plastacele, Pyralin, Nylon, and Butacite are tabulated in this concise summary. Also military and commercial applications for the synthetics. Du Pont de Nemours & Co.

A482. *Silicate of Soda* and its uses in the metal industry for sealing porous metals, for surface hardening in carburizing and nitriding are briefly outlined in Feb. number of "Silicate P's & Q's." Philadelphia Quartz Co.

A483. *Soap in War.* Soap prevents bituminous adhesive tape from sticking, combines with rubber to produce cements, is used as part of a wood waterproofing process, and is an important ingredient in metal polishes. These and other uses of soap are described in last issue of the bulletin of Assn. of American Soap & Glycerine Producers.

A484. *Standards, A.S.T.M.* 1942 Edition contains the latest approved forms of 1090 specifications and methods covering more than 4900 pp. In three parts; metals, constructional nonmetallic, and general nonmetallic materials. American Society for Testing Materials.

A485. *Water Treatment.* "The Betz Indicator" contains its discussions of unit process of water treatment with an article on silica removal from water in the hot. W. H. & L. D. Betz.

A486. "*Wood Preserving News*" recent issue, contains a detailed report of experimental railroad ties preserved with zinc chloride and creosote. American Wood-Preservers' Assn.

Equipment — Containers

E833. *Colloidal Graphite* for assembling and running-in engines and machinery, its advantages in reducing friction, greater coverage, function as a parting compound are reviewed in Bulletins 422 and 421. Acheson Colloids Corp.

E834. *Filter Systems* for food and chemical processing plants are covered in 16-page booklet, attractively illustrated. Closed, pressure, alluvial leaf type, the filters range from 24″ in diameter and 50 sq. ft. in surface to 48″ and 500 sq. ft. Niagara Filter Corp.

E835. *Instruments.* Latest issue of "Modern Precision" features the Electro-Chemograph which is said to have cut down a 24-hour vitamin analysis to 10 minutes, recording microphotometers for metal analyses, and other precision control instruments for laboratory and plant. Leeds & Northrup.

E836. *Magnet Wire Formex,* its development, dielectric strength, power factor, toughness, heat and shelf aging, temperature rating, thermoplastic flow, moisture resistance, solvent resistance, advantages, and other engineering data are detailed in GEA-3911. General Electric Co.

E837. *Manometers* for boiler feed, steam flow, turbine flow, etc., complete with curves and tables of manometer data are described in Bulletin 200. Simplex Valve & Meter Co.

E838. *Metal Production.* Ninth in a series of production data supplements, the 48-page pamphlet contains illustrated articles on precision quenching, small arms ammunition, heat treatment of shot, cleaning aluminum alloys prior to spot welding, and cooling and filtering cutting oils.

E839. *Motors and Drives.* Literature concerning single-speed and high-speed motors, Texrope Drives, Vari-Pitch Sheaves, and Speed-Changers are offered in 4-page folder. Allis-Chalmers Mfg. Co.

E840. "*Oxy-Acetylene Tips,*" first quarterly, has 22-page article of elementary instructions on how to weld pipe; summary of chemical and physical properties of acetylene in relation to the construction of cylinders; and safe practices in welding and cutting containers that have held flammable materials. The Linde Air Products Co., Union Carbide and Carbon Corp.

E841. *Power Industrial Trucks.* Instruction pamphlet for women operators of such trucks delivers necessary technical details in easy, conversational style. Explains safety provisions and closes with checklist of do's and dont's. Attractively illustrated and simply written. Elwell-Parker Electric Co.

E842. *Rotary Pumps.* First issue of new publication, "The Blackmer Swinging Vane," features the many functions of the new Blackmer Testing Dept. and Engineering Lab. and a brief discussion of types of packing illustrated with schematic diagrams. Blackmer Pump Co.

E843. "*Safety Clothing and Equipment for Industry*" catalogs safety clothing from foot guards to head protector helmets. Fireproof clothing for hazardous jobs is emphasized in Catalog No. 45. The Safety Clothing and Equipment Co.

E844. *Safety Equipment.* "Everything for Safety" is the justified title for Catalog No. 50 whose 134 pages and index describe and illustrate safety items from A to X. The Boyer-Campbell Co.

* * * * * * * * * * * * * * * * * * * *

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A479	E834	E843	QC230
A480	E835	E844	QC231
A481	E836		QC232
A482	F837		QC233
A483	E838		
A484	E839		
A485	E840		
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NEWS OF THE MONTH

GENERAL

Minimize Cross-hauling

Cooperation of the entire chemical and organic pigments industry to minimize cross-hauling and expedite loading and unloading cars in the war-time transportation shortage was recommended by the chemical and organic pigments industry advisory committee at a meeting in Washington March 2. Many cars have been conserved by the industry's observance of the minimum carloading order.

New Grain Alcohol Units

Five new grain alcohol plants, authorized by War Production Board to be built in the midwest, will cost approximately $10,000,000. Producing at least 36,000,000 gallons of alcohol from corn and wheat, the new units together with other plants previously authorized will fulfill the Baruch report recommendations for new alcohol producing facilities with an annual capacity of 100,000,000 gallons.

The plants will be of special wartime design calling for minimum outlay of critical iron, copper, and other metals. Ownership will be vested in Defense Plant Corp. who will lease the plants to private operators.

Manning Tables Essential

Chemicals division, WPB, has written to approximately 2,000 chemical plants in the United States urging them to file manning tables or, in case of critical manpower problems, selective service replacement schedules with their State selective service headquarters.

The letter urged chemical companies to work closely with their Selective Service boards to make certain that all essential employees are given proper consideration for deferment, since there is a growing shortage of trained technical men and skilled operators for chemical plants.

Drug Associations Indicted

Federal indictment charging eleven trade associations and seventeen individual leaders of the industry with illegal combination aimed at raising and fixing prices on patent medicines, cosmetics and other items commonly sold in drug stores was handed up in Federal court March 4. The association defendants were: National Association of Retail Druggists, Chicago; New York State Pharmaceutical Association, New York Pharmaceutical Council, Inc., Up-State New York Pharmaceutical Council, Inc., of Rochester; Bronx County Pharmaceutical Association, Inc., Consolidated Brooklyn Retail Pharmacists, Inc., Nassau-Suffolk Retail Pharmacists, Inc., Queens County Pharmaceutical Association, Inc., Retail Druggists Association of New York, Inc., Onondaga County Pharmaceutical Association, Inc., of Syracuse, and The Albany Retail Druggists Association, of Albany.

Increase Wilson's Powers

Donald Nelson has named three new vice chairmen, WPB, to strengthen the powers of Charles E. Wilson, executive vice chairman. These include Ralph J. Cordiner, director general for war production scheduling, who will become a vice chairman and special assistant to Mr. Wilson: J. A. Krug, director of Office of War Utilities, who was named vice chairman in charge of materials distribution and chairman of requirements committee, and Donald D. Davis, director of program bureau, who was appointed vice chairman for operations. Curtis Calder, Director General for Operations, is executive assistant to Mr. Wilson. Thus Wilson will have all the reins of WPB in his hands under Mr. Nelson.

Spring Meeting of ACS

Detroit, Mich., will serve as host to the members of the American Chemical Society who attend the 105th meeting from April 12 to 16. The annual spring event will once again be devoted entirely to products for war.

Licensees of Seized Patents

Leo T. Crowley, Alien Property Custodian, has announced that vesting by his office of patents of foreign nations does not mean that rights of American licensees under seized patents were likewise vested.

Wheat Alcohol Production

Progress made in alcohol production from granular wheat flour and the recovery of solids from the beer slop were discussed at the 2nd National Conference on Wheat Alcohol Production held Feb. 25-26 at the Department of Agriculture, Northern Regional Research Laboratory at Peoria, Ill. Twenty-five industrial alcohol distillers were represented as well as several government laboratories and agencies and four universities.

Conclusions reached were that granular wheat flour will give higher yield than whole wheat or corn on the dry basis, this being mainly due to the increased starch content in the granular flour. Recovery of solids from the slop is both difficult and expensive as compared with whole wheat or corn, but the government is interested in doing this to relieve the serious shortage of protein foods. Prior to the war this country imported large quantities of such foods.

War Production Board officials predicted that if the war continues there will be a shortage of alcohol since it will be used for the production of butadiene. Large ethylene plants may soon be built to save wheat, since the food and crop situation may become serious. It was felt that there is little hope of importing molasses, even if the submarine menace is eliminated, but in the event of an actual food shortage sufficient pressure may be brought upon the Army to release some tankers for this purpose. Most of the alcohol from grain and molasses will be made in existing plants.

For the short time, no limits on the sale of wheat for alcohol production are anticipated since there are still large stocks in this country and Canada.

Phila. Quartz Vice President

Chester L. Baker, chemical director of Philadelphia Quartz Co., has been named Vice-President—Manufacturing & Engineering. He developed the method of commercially manufacturing sodium metasilicate penetahydrate and other crystalline alkali metasilicates and has done considerable work on commercial detergent and adhesive engineering.

Derby Leaves N. L. R. B.

Harry L. Derby, president of American Cyanamid, has resigned as an employer-member of National War Labor Board with which he has worked for the past thirteen months.

Copper Scrap Outstanding Problem

Copper scrap is the number one industrial salvage problem in 1943, although iron and steel scrap collection must be maintained at high level, Hamilton W. Wright, chief of War Production Board's Industrial Salvage Branch, told a conference of regional chiefs.

Industrial salvage must produce a very large per cent of the scrap necessary to keep America's steel mills, copper, and aluminum plants at peak war operation during this year, Mr. Wright explained. The collection of iron and steel scrap cannot be neglected in any particular, however, because 13 million tons of purchased iron and steel scrap will be needed by the nation's steel mills in the first half of 1943. Dormant scrap must fill a large part of this need.

Fighting Fats and Oils Shortage

Manufacturers of fatty acids, meeting recently in Washington, with representatives of the Department of Agriculture, discussed ways and means of combating the shortage of fats and oils. As tall oil—a by-product of the woodpulp industry—is an "extender" of fats and oils and raw materials for its production are in almost unlimited supply, the Food Distribution Administration is asking the fats and oils industry for proposals to expand tall oil refining capacity.

The industry also was asked to present data on the end uses of fatty acids and the possibility of substituting fatty acids for neutral oils. A report on the feasibility of pressing lard oil with existing equipment was requested.

Ridgway is Schoellkopf Medalist

Jacob F. Schoellkopf Medal, given annually by the western New York section, A.C.S., for distinguished research, has been awarded to Raymond R. Ridgway, associate director of research, Norton Co. Mr. Ridgway is credited with the isolation and commercial production of boron carbide, used as a substitute for diamonds in drilling and other manufacturing processes.

New Rubber Development Corp.

New government-sponsored agency to be known as Rubber Development Corp., and invested with entire charge of procurement of natural rubber in Latin America, is being set up by Reconstruction Finance Corp.

With a reported capitalization of more than $35,000,000, it will be headed by W. L. Clayton, assistant Secretary of Commerce, as chairman of the board, and by Douglas Allen, now of Rubber Reserve Co., as president. Reed Chambers of New York, as operating vice president, will make his headquarters in Brazil.

The corporation's rubber imports will be distributed by Rubber Reserve Co. at the direction of William M. Jeffers.

OPA Chemicals Chief Resigns

Patrick Murphy Malin, chief of Chemicals Branch, OPA, has resigned to transfer his affiliations with the government to the Office of Foreign Relief and Rehabilitation Operations headed by Herbert Lehman. Joseph D. Coppock, who has been Mr. Malin's first assistant since the former's appointment by Leon Henderson will succeed to the position. Previously Mr. Coppock was chief of the economic analysis section of Surplus Marketing Administration.

Rubber in African Cactus

British experts are going to North Africa to investigate a variety of cactus which has a considerable rubber content and is growing on the slopes of Atlas Mountains. The latex is contaminated with resin and its purification has proven difficult. Because the latex may poison gatherers of the cactus, its handling is also a problem to be solved.

Tung Oil Conservation

Tung oil users are urged to substitute oiticica oil whenever possible in order to conserve existing tung oil supplies and to prevent the deterioration of oiticica stocks through long storage, according to an announcement by the Department of Agriculture. The substitution is requested by Fats and Oils Branch of Food Distribution Administration which also suggests that users prepare their applications (WPB form PD-600) for April allocations in line with this policy.

Tung oil is in great demand for protective coatings for military weapons, and supplies are greatly reduced because of shipping conditions. Present requirements are being met from domestic production and pre-war imports from China. Oiticica oil is obtained from Brazil.

Science Scholarships Awarded

Winners in Westinghouse's talent search for the year are Ray R. Schiff, New Rochelle, N. Y., and Gloria Induslauere, Ames, Iowa, who received the highest awards, four-year $2,400 science grand scholarships. The prize winners, chosen from a field of 15,000 candidates, received the presentations at the banquet session of Science Talent Institute March 2. Dr. Thomas J. Parran, surgeon general of U. S. Public Health Service, was the honor guest and in an address on "Science and the Future," welcomed the forty scholarship recipients to that "ancient and honorable company of scholars upon whose curiosity and knowledge and integrity so much depends."

Rare Instruments Listed

The Committee on Location of New and Rare Instruments has the following requests and offers:

Instruments Requested

- Cathetometer (32" ± 0.003")
- Two-circle reflecting Goniometer
- Loewe Zeiss Liquid Interferometer
- Quartz Microscope
- Zeiss Optimeter
- Hypervac Vacuum Pump (Cenco No. 93,000)
- Refractometers: Bausch & Lomb and Zeiss-Pulfrich
- Quartz Spectrograph

Instruments Offered

- Leeds and Northrup Thermionic Amplifier No. 7673
- Alb. Rueprecht & Sohn Analytical Balances
- Roller-Smith Co. Surface Tension Balances
- Bausch & Lomb Centrifuge
- Gaertner Chronograph
- Fisher Electropode
- Leeds and Northrup Microammeter Type R
- Weston Microammeter for D.C.
- Microscopes: Bausch & Lomb, Poller, Winkel-Zeiss, Zeiss
- Sartorius-Werke Brain Microtome
- Hartnack Polariscope 400 mm. tube
- Cenco Hyvac Pumps
- pH meter model Chemie (Bergmann & Altmann)
- Radio Test Instruments dipping type
- Bragg X-Ray Spectrometer
- Keuffel & Esser Spectrophotometers
- Franz Schmidt & Haensch—Spectroscope (student model)
  - Spectrometer, Grating Spectrograph, Universal
  - Spectrograph, Precision Micro-Colorimeter, Immersion Colorimeter
- Chemical Model of the German Typewriter "Adler"
- G.E. Wattmeter Type P3

Information concerning these offers and requests for rare instruments that can be sold, loaned or leased for essential war or other research can be obtained from D. H. Killeffer, chairman of the Committee, 60 East 42nd Street, New York, N. Y.

New Director, Containers Div.

Appointment of Roswell C. Mower as director of WPB containers division to succeed Charles L. Sheldon, who resigned Feb. 26, was announced by Hugh Hughes, director of the Commodities Bureau.

Industry Cooperation with Press

America's industrial leaders have a definite share of the responsibility for maintenance of a free and honest press, according to James W. Irwin, assistant to president, Monsanto Chemical Co., who spoke at the closing session of Industrial Relations Institute on March 12. His address, "Industry and the Press," drew a marked contrast between the method of labor organizations and of industry in presenting their cases to the public through the press.

Industry's share of the responsibility, Irwin said, is "to see that the press and radio receive cooperation, are permitted to obtain facts, and thus are able to base their stories and their editorial comment upon data that is true and not false or falsely inspired."

Curtail Butadiene Projects

Halting of the construction of facilities for the production and purification of butadiene at three refineries was recommended, according to Office of the Rubber Director, when it became evident that some of the large butadiene manufacturing units may ultimately run at more than their originally rated capacity. Moreover, because of shortages of components, the more recently approved plants could not be completed as soon as expected. It seemed advisable, therefore, to cancel some of the more recently approved conversions which could not be expected to contribute much, if any, "quick" butadiene needed during the summer and early fall of 1943.

Projects which were halted: Beaumont refinery, Magnolia Petroleum Co., Dallas, Texas; Wood River, Illinois, refinery, Standard Oil Co. of Indiana; and Texas City, Texas; refinery converting of the Pan American Refining Corp.

1942 A. S. T. M. Standards

Recently complete 1942 Book of A. S. T. M. Standards contains in their latest approved form all of the Society's specifications and tests for materials, definitions, and recommended practices. This edition has 1090 specifications and standard methods which cover more than 4900 pages and is issued in three parts:

Part I, Metals.—Ferrous and non-ferrous metals (all A and B and some E serial designations) except methods of chemical analysis. General testing methods (E serial designations).

Part II, Nonmetallic Materials—Constructional.—Cementitious materials, concrete and aggregates, masonry building units, ceramics, pipe and tile, thermal insulating materials (all C serial designations). Timber and timber preservatives, paints, varnishes and lacquers, road materials, water-proofing and roofing materials, soils (certain D serial designations). General testing methods, thermometers (E serial designations).

Part III, Nonmetallic Materials—General.—Fuels, petroleum products, electrical insulating materials, rubber, textiles, soaps and detergents, paper, plastics, water (remainder of D serial designations). General testing methods, thermometers (E serial designations).

Supplements to each part will be issued in 1943 and 1944 to keep the books up to date. For copies write to American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa.

Fellowships Sponsored by Gulf Oil

Gulf Oil Corp. has announced the inauguration of fellowships in the fields of physics, chemistry, geology, engineering, and business administration at eleven colleges and universities. Application for the fellowships is open to graduates of recognized colleges and universities and to men or women who, through established training and achievement, are able to demonstrate their preparedness for advanced training.

Thermofor Catalytic Cracking

Development of a new catalyst that may step up the quality of high-octane gasoline to the point where it would give 23 to 35 per cent more power to supercharged aircraft engines or mean a 13 to 30 per cent increase in the yield of aviation gasoline base stock from given crudes was announced recently by Socony-Vacuum Oil Co.

The new agent, a synthetic product, is known as a "bead catalyst" because it is in the form of small spherical particles resembling glass beads. It is translucent and although extremely hard and resistant to wear, is very porous. The function of the "bead catalyst" is to break down the molecules of crude oil and permit a greater yield of high-octane fuels.

Toohy Joins OPA

John J. Toohy, former chairman of Drug, Chemical and Allied Trades section and manager of distribution of E. R. Squibb & Sons, has been selected to serve in chemicals branch, OPA, as assistant to J. D. Coppock, department head. Mr. Toohy will have within his jurisdiction drugs, cosmetics, fine chemicals, soaps, waxes and glycerine.

Nominations for Hyatt Award

Closing date for nominations for second annual John Wesley Hyatt Award, to be presented for an outstanding contribution to the plastics industry in 1942, has been set as March 15. All individuals contributing to the plastics industry are eligible for the award, which consists of $1,000 and a gold medal donated by Hercules Powder Company, manufacturer of plastics raw materials. Chemists, laboratory technicians, injection, compression, or transfer molders, extruders, laminators, or fabricators, manufacturers of plant equipment machinery, raw material suppliers, mold makers, or mold designers, industrial designers, sculptors or other artists, are among those eligible.

Rubber Output Decreased

Because of many delays which have beset the synthetic rubber production program, the output this year is now expected to total only 241,000 long tons, instead of the 354,000 envisaged in his first progress report, William M. Jeffers, Federal Rubber Director, said in a second report dated Feb. 18. It appeared, he added, that the most critical period would come between October this year and March, 1944, after which supplies should exceed consumption.

Venezuela 2nd Largest Refiner

Approval of new petroleum legislation sponsored by the Venezuelan government would enable Venezuelan oil refineries to increase their daily output from 72,000 to 192,000 barrels within five years after the war, according to President Isaias Medina. This, he said, would make Venezuela the second largest refiner among the world's oil-producing nations.

First Vice President

George Van Gorder was elected to the newly created position of first vice president of McKesson & Robbins. Associated with the wholesale drug industry for twenty years, Mr. Van Gorder has been a vice president of the company since the Hall-Van Gorder Drug Co. merged with it in 1928. He is also serving as president of the National Wholesale Druggists Association.

Glyco Sponsors Fellowship

Dr. C. B. F. Young, director of Institute of Electro-Chemistry and Metallurgy has announced establishment of a new fellowship sponsored by Glyco Products Co.

The incumbent for 1943-1944 is S.

Eichel whose field of research will be that of metal pickling inhibitors with special attention directed toward the use of non-ionic wetting agents.

COMPANIES

Hercules Honored for Safety

Hercules Powder Co. which maintained an accident severity rate 56% better last year than in 1941 in its industrial and military explosives plant has been presented with a "Liberty Bell" safety award. National Safety Council selected Hercules for the honor, the second award of its kind to be made. Only one fatality was recorded in explosives plants compared to three the preceding year, and a million more hours were worked.

American Colloid Instructs

American Colloid Div. of E. F. Drew & Co., Inc., manufacturers of industrial chemicals, has been assisting U. S. Maritime Service in training civilians for merchant marine positions by donating time, services and equipment for an intensive five-week course in boiler feedwater treatment at U. S. Maritime Service Training Station, Sheepshead Bay, Brooklyn, N. Y.

Alien Property Takes Hellige

Alien Property Custodian office has taken over direction, management and supervision of Hellige, Inc., N. Y., manufacturers of scientific laboratory supplies.

Dr. Paul A. E. Hellige, sole owner of the company and a German citizen resident in the United States, was taken into custody by the Federal Bureau of Investigation.

Vulcan Resumes Detinning Plant

WPB has authorized the Vulcan Detinning Co. to resume construction on its Neville Island (Pittsburgh) plant which had been halted by a revocation order Feb. 10. Resumption of work on this plant is permitted in view of the fact that the facilities are almost completed and a very small amount of critical material and equipment is needed to place the plant in operation. Revocations of authorizations to construct other detinning plants remain in effect.

Construction of the detinning facilities was deferred not because of any easing in either the tin or scrap steel situation, but rather because the motors, boilers, tanks, and other equipment used in detinning are more urgently needed in other phases of the war effort.

Hooker to Begin $AlCl_3$ Plant

Defense Plant Corp. allotted approximately $200,000 to Hooker Electrochemical for an aluminum chloride plant in the northwest. Aluminum chloride will be used in the production of synthetic rubber.

Sharp & Dohme Open Lab

Sharp & Dohme, manufacturers of biological products, will open another laboratory in St. Joseph, Mo., for the production of anti-hog cholera serum and hog cholera virus. Dr. Joseph E. Schneider, director of Mulford Biological Labs. of Sharp & Dohme will operate the St. Joseph plant.

Tycrete Buys Magnesite

Tycrete Products Corp., Beverly Hills, Cal., have purchased a magnesite deposit containing as high as 90% magnesite for more than $1,000,000. Magnesite products are used for their tensile strength and water and fire protective qualities.

New Chemical Firm in Woodbine

New chemical firm, the Seaboard Seatex Chemical Corp., has opened offices in Woodbine, N. J., to prepare chemical articles, compounds, cements, oils, and pigments.

Schenley to Manage War Unit

Schenley Distillers Corp. will operate a projected war alcohol plant at Moline, Ill. The unit will be one of five new plants to be constructed in the grain belt to convert huge grain surpluses into war alcohol chiefly for synthetic rubber, and for smokeless gunpowder, lend-lease and other military uses.

ARMY-NAVY "E" AWARDS

Hercules Powder

Two New Jersey units of the Hercules Powder Company—the Kenvil explosives plant and the Union Cellulose products plant at Parlin—received Army-Navy "E" awards Feb. 3. They were cited for their excellence in producing smokeless powder and nitrocellulose.

Mathieson Alkali

Niagara Falls plant of Mathieson Alkali was honored on Feb. 26 with the Army-Navy Production Award for high achievement in the production of chlorine, synthetic ammonia, caustic soda, high test calcium hypochlorite, sodium chlorite, sodium methylate, and other chemicals that are vitally needed for the nation's war effort.

Wannamaker Chemical

Presentation of Army-Navy "E" award was made to Wannamaker Chemical Co. Feb. 17. Maj. Gen. Emile Moses explained that the award signified quantity in production, and involved quality, safety methods in operation, satisfied workmen and other attributes.

Du Pont

Army-Navy "E" flag was presented to the Dye Works Units of Du Pont, Deepwater Point, N. J., on Feb. 25. Du Pont men and women producing dyes, tetraethyl lead for high test gasoline, alcohol, synthetic camphor, refrigerants, pharmaceutical intermediates, textile agents, seed disinfectants and numerous other essential products, received "E" pins.

One of the first Army-Navy "E" awards made to the construction industry was presented on March 3 to employees of the construction division of Du Pont who built the Wabash River Ordnance Works.

The 19th of 23 Army-Navy "E" awards made to plants operated by Du Pont was presented to Pompton Lakes Works Feb. 26. One of the oldest plants of Du Pont's Explosives Dep't, the Pompton Lakes Works makes ordnance items and was also outstanding in military production during the first World War.

Employees of the construction division, du Pont de Nemours, who built Chickasaw Ordnance Works received the Army-Navy "E" Production Award March 5.

Monsanto

Monsanto executive branch in St. Louis and two plants, one at Anniston, Alabama, and the other at Monsanto, Tennessee, have been awarded another star for their "E" pennants, the third honor by the Army and Navy for continuing excellence in war production.

Goodrich

B. F. Goodrich Co. announces the award of an Army-Navy "E" to its Koroseal plant in Niagara Falls for high achievement in the production of war materials.

Badger & Sons

Brig. Gen. Leslie D. Groves, Deputy Chief of Construction Div. Office, Chief of Engineers, Washington, D. C., presented the Army-Navy Award for Excellence in war construction to the men and women of E. B. Badger & Sons Co. at the West Virginia Ordnance Works, Point Pleasant, W. Va., on March 4.

National Magnesium

National Magnesium Corp., one of the first fifty companies to receive the Army-Navy "E," has been granted the privilege of adding a white star to its pennant, in recognition of the company's continued high production. The original award and star were received within one year after beginning operations.

The company produces magnesium powder used in the manufacture of flares, tracer bullets, photo flash bombs, float lights, aircraft signals and submarine signals.

ASSOCIATIONS

Dr. Ott Addresses Phila. Group

Philadelphia Section, A. C. S., heard Dr. Emil Ott speak on "The Relation of Physical Characteristics and Chemical Structure of Cellulose Derivatives," March 18 at Franklin Institute. Dr. Ott discussed the many apparent anomalies existing among familiar high polymers and correlated theoretical and experimental data. While cellulose and cellulose derivatives were used as the central theme for this discussion, pertinent comparisons with other high polymers were included.

Neal Speaks on Buna S

Chicago Rubber Group, at its first meeting of 1943, discussed the talk given by the speaker of the evening, Dr. Arthur M. Neal of du Pont who spoke on "The Use of Accelerators in Buna S."

Indiana ACS Hears Cislak

America was not dependent upon Germany for coal tar products when the present war started and thus is in a much better position to wage effective warfare today than in 1917, according to Dr. F. E. Cislak, director of research, Reilly Tar & Chemical Corp. Dr. Cislak spoke at the Indiana section meeting of American Chemical Society at Hotel Severin March 2.

Du Pont Advances Two

J. Warren Kinsman

Dr. J. A. Almquist

J. Warren Kinsman has been appointed assistant general manager of the organic chemicals department, E. I. du Pont. Dr. Almquist succeeds to Kinsman's position as assistant general manager, plastics department.

Shore Addresses AICE

Mr. T. Spencer Shore, vice president and treasurer of General Tire & Rubber Co., addressed the N. Y. Section of American Institute of Chemical Engineers on the subject of "Industry, People and Government" March 11.

Mr. Shore discussed methods by which chemical engineers can use their training, experience, and position to build a better America so that the building of chemical plants will continue.

Louisville Paint

A. C. Mueller, Nuodex Products Co., was guest speaker at the Louisville Paint and Varnish Production Club on Feb. 18. He discussed "Comparative Efficiency of Driers at Elevated Temperatures," explaining the use of cobalt and manganese as active driers, and lead, zinc, calcium and iron as auxiliaries.

Lucas Discusses Rubber Latices

Western Connecticut Section, A. C. S., heard Dr. Francis F. Lucas, Bell Telephone Labs., discuss "Latices of Natural and Synthetic Rubbers" and studied his motion pictures of Balata and Hevea latices with observations on the Buna S and Neoprene latices, March 29.

Schwenk on Sex Hormones

Dr. Erwin Schwenk, vice president of Schering Corp., addressed the North Jersey Section, A. C. S., on "The Chemistry of Sex Hormones," March 8. The isolation methods for the protein-like sex hormones and the technical preparation of the steroid hormones were included in the discussion.

PERSONNEL

New Program Coordinator

Melvin E. Clark has been made chief of the Program Coordinating Section, Chemicals Division, WPB. He was formerly a unit chief in this section and before coming to WPB was in market research work at Wyandotte Chemicals Corp.

Brazilian Chemical Aid

Paul F. Kruger, vice-president and director of production operations, Anglo-Chilean Nitrate Corp. and Lautaro Nitrate Co., Ltd., Antofagasta, Chile, has been appointed by the United States Government to aid in the search for and development of resources of critical metals and minerals in Brazil. Mr. Kruger helped develop the Guggenheim nitrate process.

Gas Tech. Additions

Institute of Gas Technology, Chicago, has added to its staff Dr. Samuel W. Martin, George J. Verbeck, Cornel Wohlberg and Vito C. Lazzaro. Dr. Martin was with the titanium division, National Lead Co., and has been doing post doctorate work at Princeton. Mr. Verbeck was research chemist with Abbott Labs. and Portland Cement Assoc. Mr. Wohlberg had also been associated with National Lead, and Mr. Lazzaro was with West Virginia Pulp & Paper for five years.

Other Personnel

James A. Davis has been appointed to the technical staff of Battelle Memorial Institute, Columbus, O., where he has been assigned to metallurgical research related to the war effort.

Mary M. Donovan, former graduate assistant at Univ. of Pittsburgh, also has been appointed to Battelle and assigned to its division of physics research.

Miss Donovan will be engaged in research on the electron microscope and its utilization.

Dean A. Powers, electrical engineer, formerly with Public Utilities Commission of Ohio, will assist in the electrochemical and electrometallurgical research of Battelle.

Dr. R. S. Jane, formerly of Shawinigan Chemicals Limited, will direct the newly established Industrial Research Dept. of Shawinigan Water & Power Co., Montreal, Quebec.

Paul R. Beck has been elected president and **John Beck, Jr.,** made secretary and treasurer of Pennsylvania Refining Co., Butler, Pa.

John F. Byrne, general manager of Blast Furnace division, Granite City, Ill., has been elected a vice-president of Koppers United Co.

F. Carl Hirdler, Jr., chemist and processing engineer, has joined Los Angeles laboratory staff of Turco Products, Inc. He is conducting a wartime course on aircraft maintenance problems.

Norman C. Hobson has been appointed manager, Salt Division of Canadian Industries Ltd.

Quaker Chemical announces several additions to its organization: **Tulio Cordero,** formerly with United Drug, and **Dr. Boris Schwartz** have been appointed to the research staff; **D. W. Prichard,** formerly associated with W. H. & L. D. Betz, has joined the technical sales division.

Liquid Carbonic Corp. has announced the election of **A. F. Wall** and **Horace C. Wright** as new board directors. Mr. Wall is general manager of the company's oxyacetylene activities operated as the Wall Chemicals Div. Mr. Wright is president of Chicago Flexible Shaft Co.

Atlas Powder Co. promotes **Ralph K. Gottshall** to director of sales of Explosives Dept. and **William T. Mahood** to manager of northwestern district.

Jack Sandler, formerly with Northern Industrial Chemical Co. and Nixon Nitration Works, will head the plastics program of Aircraft Parts Development Corp. as chief plastics engineer.

John B. Klumpp, well known in the gas engineering field, has been elected to the board of directors, American Meter Co.

Second Lieutenant William L. Luaces, CAC (AA), on leave as vice-president of Research and Development Corp., has been transferred from Camp Davis, N. C., to Army Intelligence School at Camp Ritchie, Maryland.

Fenwick W. Smith has been appointed manager of the government and industrial division of The R. M. Hollingshead Co. of Canada, manufacturers of "Whiz" products, which include industrial chemicals and lubricants.

W. **I. Gladfelter,** formerly with Bethlehem Steel and Westinghouse Electric Mfg. Co., has been appointed vice president in charge of operations for the Crown Can Co. His new duties include complete direction of all company engineering and production operations.

Ellsworth E. Kimmel, formerly with Carnegie-Illinois Steel Corp., was assigned to Battelle's division of chemical research.

Directors of Continental Can elected **Dr. Ernest Martin Hopkins,** president of Dartmouth College, a director of the company on March 10.

Philadelphia Quartz Company appointments include **Claire H. Jeglum**—assistant to chemical director, **Harry L. Bolton**—assistant chemical manager for quality control, and **Alfred H. McKinney**—chemical engineer.

OBITUARIES

Francis J. Pond

Dr. Francis J. Pond, 71, director of Morton Memorial Chemistry Laboratory at Stevens Institute of Technology, and consultant in chemical research, died Feb. 18, of a heart attack at his home in Upper Montclair, N. J.

John G. Barry

John G. Barry, 74, honorary vice president of General Electric, died in his home at Schenectady, N. Y., March 4 after a long illness.

Charles R. Barton

Charles R. Barton, in charge of manufacturing for Tide Water Associated Oil Co., died in his home at Summit, N. J., Feb. 17. His age was 51.

William Klaber

William Klaber, industrial chemist, died Feb. 20 in Orange Memorial Hospital, N. J. at the age of 57.

Edward M. Farrell

Edward M. Farrell, 48, salesman for du Pont for the last seventeen years, died at his home in Kew Gardens, Queens, on Feb. 17 of a heart ailment.

Frank H. Gazzolo

Frank H. Gazzolo Sr., 72, president and founder of Gazzolo Drug and Chemical Co. and former instructor at Harvard, died Feb. 15 in his home at Evanston, Ill.

Walter R. Kornfeld

Walter R. Kornfeld, 22, chemical engineer, was the third victim of an explosion and fire that damaged the plexigum building of the Rohm & Haas Chemical Co. plant, Bristol, Pa. Mr. Kornfeld was graduated from Temple Univ. last year.

Thomas R. Tennant

Thomas Ralph Tennant, 59, prominent in the gelatin field and general manager of United Chemical Products Co., died suddenly following a heart attack March 1.

FINANCIAL

Du Pont Earns $5.07 a Share

Largest sales volume in its history and the smallest net income since 1938 are revealed by E. I. du Pont de Nemours and Co. in its 1942 annual report.

Sales and other operating revenues were $523,463,385, about 4% greater than in 1941. Consolidated net income, including dividends of $20,000,000 from holdings of General Motors stock, was $63,941,275, about 29% less than in 1941. Consolidated income includes income received for operating Government-owned plants, the sales from which are not included in the sales figure.

Higher labor rates and other costs, higher tax rates and lower returns on investments were responsible for the decline in earnings.

Earnings applicable to the common stock were $5.07 a share, compared with $7.49 in 1941. Dividends paid on common stock aggregated $4.25 a share, compared with $7.00 a share in each of the three years preceding.

Union Carbide Reports $38,083,723

Union Carbide and Carbon Corporation, in its report for 1942, shows a net income, after taxes, depreciation, etc., of $38,088,723, equal to $4.10 a share, as against a net for 1941 of $42,041,625, or $4.35 a share. The postwar refund of the excess profits tax in the amount of $3,780,688, and not included in the net income, together with an additional $6,219,312, was used to create a reserve for post-war contingencies, the report states.

This fund has been created to meet contingencies that may arise in the period of readjustment after the end of the war. Income for the past year, before taxes and other deductions, totaled $138,359,798, as compared with $106,759,420 in 1941.

Freeport Sulphur Clears $2,436,655

Net income of Freeport Sulphur Co. in 1942 amounted to $2,436,655, or $3.05 a common share, compared with $3,149,030, or $3.95 a share, earned in 1941, according to the annual report. The figures included the company's proportion of net income of Cuban-American Manganese Corp., $443,877 for 1942 and $657,862 for 1941.

Net sales were $14,697,952, against $14,408,052 in 1941. Federal and State income and Federal capital stock taxes required $616,000 in 1942, compared with $578,000, and Federal excess profits tax, net of $12,000 debt retirement credit, was $109,000, against $122,000 in 1941.

Gains from Inventories

Profits from inventories carried over from 1941 at prices substantially below the current market were a contributing factor in the increased earnings last year of Commercial Solvents Corp., Theodore P. Walker, president, reports in the annual statement.

Net earnings for 1942, including excess profits tax refund credit, were $3,340,034, equal to $1.27 each on 2,636,878 common shares, compared with $2,615,453 or 99 cents a share the year before. The profit in 1942, before Federal taxes on income, was $10,635,033.

Net sales last year rose to $36,934,309 from $24,664,166 in 1941.

Monsanto Nets $3.75 per Common Share

Although sales of Monsanto Chemical Co. and its American subsidiaries last year increased 8.5% to $69,146,999, the net income after taxes decreased 18% from 1941, as disclosed by the annual report of Edgar M. Queeny, president.

Net earnings, after taxes and deduction of minority interest, were $5,515,836, the equivalent of $3.75 a common share, compared with $4.90 a share in 1941. Net income before income taxes was $16,588,738, an increase of $162,000 over the previous year, but estimated taxes on 1942 income were $11,001,000, or $8.75 a common share, compared with $9,609,250, or $7.71 a share, in 1941. Dividends paid last year totaled $2.25 a share on the common stock.

Allied Chemical Earns $20,457,601

Volume of business in dollars transacted last year by Allied Chemical and Dye Corp. increased 6% over the record volume of 1941, according to the annual report of H. F. Atherton, president.

The consolidated net income for 1942

(*Continued on page 375*)

Research Dispels Some Myths About Rosin in Soap

EXPLODING in convincing fashion what is left of the old belief that rosin in soap serves only as an inert extender or filler, Hercules Powder Company recently made public the results of three years of intensive research on this subject which indicate that the right grade of rosin, in the right amount, actually aids detergency and sudsing in all types of soap.

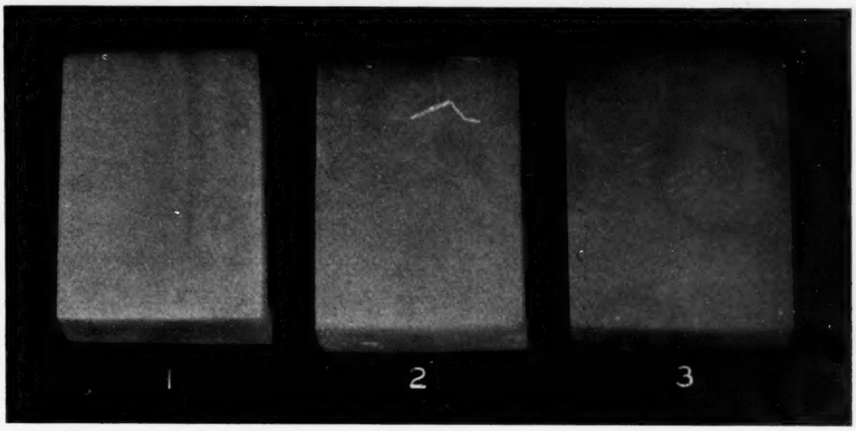
Though started as a peacetime development, this work becomes of unusual interest currently because of the critical war shortages of soap-making fats and oils. Used correctly, rosin can replace saponifiable fats up to 30 per cent in bar soap stocks and up to 15 per cent in spray-dried and chip soap stocks without loss of any important soap qualities and with improvement in some, it is claimed.

Rosin was first used in soap manufacture in the middle of the last century, when it entered into laundry and other high-tallow content soaps. This limitation in its use in soap has continued, so that in 1942 only about 125,000,000 pounds of rosin were consumed by the industry in producing about 3,900,000,000 pounds of all types of soap. On the basis of an estimated 1943-44 output of rosin of 725,000,000 pounds and current stockpiles of 500,000,000 pounds, it is estimated that supplies are ample for trebled consumption by the soap industry without danger of conflict with military and other established needs. Also of interest is the fact that soap-grade rosin is currently quoted on the market at 4-6c a pound as against 9c a pound for tallow.

Advantages of Rosin

The Hercules data indicate that when the right choice of rosin is used as a part of the soap stock and in proper proportion (in the range of 3 to 30 per cent on the total stock) certain definite advantages—chiefly improved solubility and

These three bars of soap show the relative amounts of color in (1) a white toilet soap; (2) a white base soap (75 per cent white tallow to 25 per cent coconut oil) with 5 per cent of Staybelite (hydrogenated rosin) soap; and (3) the same white base soap containing 5 per cent of N wood rosin soap.



Dr. J. N. Borglin cuts bar of soap containing rosin. The specially designed kettle used for preparing test soaps is in background.

better sudsing and detergency—can be achieved. Aging and odor characteristics are shown to be satisfactory where the soaps are properly made.

Color, formerly one of the chief objections to use of rosin, in the case of spray dried and chip soaps compares favorably with similar soaps free of rosin. In bar soaps the amount of color depends upon the grade and proportion of rosin used. By using light-colored rosin derivatives developed in recent years, such as hydrogenated rosin and polymerized rosin, light-colored soaps can be made. For the duration, however, only the ordinary grades will be available for most soaps because of limited hydrogenation and polymerization facilities.

In the spray-dried and flake soaps, dusting and resultant sneezing are found to be greatly reduced by the use of rosin. Originally fearing stickiness and lumping of these spray-dried soaps, Hercules tested them under varying conditions and found that up to 15 per cent rosin content there was no lumping or caking when exposed for 300 hours at 80° F. in an atmosphere of 97 to 100 per cent relative humidity.

Special Lab Equipment

The large scale laboratory equipment used in carrying out the work on rosin soaps is stated to have been specially designed to reproduce as closely as possible results actually obtained in commercial soap making. Cooking apparatus consisted of a 17-liter glass kettle. The spray-dried soaps were prepared in a pilot-plant spray drier into which the soap was introduced from an autoclave at 178° C. and 175 lbs. per sq. in. pressure countercurrent to a nitrogen stream at 111° C.

Both gum and wood rosin were used in the work. Detergency and sudsing tests were conducted using water of different degrees of hardness, and detergency was measured against a straight neutral sodium soap made from prime white tallow, using a launderometer and standard "dirt" swatches.

Although it has progressed sufficiently far for an announcement of results, the work on rosin in soap is being continued with special emphasis on its relation to the present fat and oil shortages, it is stated by Hercules.

Overall picture of spray-drying equipment with Lois Hans, Hercules woman chemist, in background.

CHEMICAL SPECIALTY COMPANY NEWS

Foresters Discuss Compounds

Chemical treatments for wood were discussed by L. F. Livingston, manager, Agricultural Extension Div. of du Pont at the meeting of Allegheny Section of American Foresters. As examples Mr. Livingston cited the use of a spray of orthodichlorobenzene and Diesel oil to kill bark beetles, applications of solutions of sulfuric acid and caustic soda to increase the gum flow of pine trees, surface protection against wood-rotting organisms given by phenyl mercury oleate, prevention of premature decay, termite attack, and fire by chromated zinc, and use of crystal urea to make green wood thermoplastic and eliminate seasoning degrades in sawed lumber.

Odor Neutralizer

Magnus, Mabee & Reynard have found their odor neutralizer, Deodorant L-37 MM&R effective in formulae employing Lethane 384, Lethane 384 Special, Thanite, Velsicol. It tends to neutralize undesirable odor features of the toxic ingredient, as well as the diluents commonly used in the manufacture of sprays.

A reduction in the price schedule of this neutralizer, based on increased volume and manufacturing economies has also been announced.

"Health Bomb"

America's fighting men in tropical jungles are now armed against malaria and yellow fever with a new "health bomb" that exterminates disease-carrying insects. The new weapon is an insecticide dispenser that discharges a mist fatal to disease-spreading flies and mosquitoes, but harmless to humans. The six inch metal dispensers—each about the size of a tin can—are called "bombs" by workmen who make them at the rate of thousands a day in an eastern Westinghouse plant.

With the dispenser, the Army hopes to reduce sharply the casualty rate of past wars, in which disease incapacitated as many men as did bullets. The "health bombs" will be discharged frequently in tents and barracks wherever troops are stationed in the tropics, and in the cabin of every airplane—military and civilian—that takes off from a tropical base.

Army Insecticide Dispenser

Manpower Crisis in Aromatics

Food flavorings may be sharply curtailed if synthetic aromatic chemical manufacturers suffer further losses of workers. Classified as a nonessential industry, extract manufacturers find that many of their chemists are being placed in high selective service classifications.

FINANCIAL

(*Continued from page 368*)

was $20,457,601 after all charges, equal to $9.24 a share. In the previous year it was $21,416,566, or $9.67 a share. The company's gross income before Federal income and excess profits taxes was $44,524,183 last year, against $45,264,723 in 1941.

The hourly wage rates at the end of last year were 18 per cent higher than in 1941 and 64 per cent larger than in 1929, the report disclosed. In addition to regular dividends of $6 a share, the company paid a special dividend of $1 to its shareholders. Taxes, it was pointed out, equaled $13.75 a share of stock.

United Carbon Gains in 1942

United Carbon Co. reports its operations for the year resulted in earnings of $3,449,720.11 before income and excess profits taxes, as against $2,856,547.08 in 1941—an increase of $593,173.03. The charges against income included $1,887,074.37 for depreciation and depletion.

Net profit after income and excess profits taxes was $1,780,520.11. This compared with $1,711,547.08 for the previous year and was equal to $4.47 per share compared with $4.30 in 1941—a gain of 17 cents per share. Sales totaled $10,314,859.02 and were down $1,087,216.99, or 9½% from the preceding year.

INDUSTRIAL TRENDS

Construction Volume Doubled

War construction activity in 1942, which reached a total value of $12,145,059,000, more than doubled the 1941 volume and amounted to more than 97 per cent of the program for the year, the War Production Board announced.

Direct military construction during 1942 was three times the volume of the previous year, and factory construction was 2½ times the 1941 total. Housing construction in the war production areas maintained the 1941 level, while construction of privately financed factories declined.

Monthly volume of construction, which reached a peak of $1,406,015,000 in August, declined for the fourth successive month to $973,285,000 in December, a 31% drop from the year's high. As an indication of the trend for 1943, there was a further decline of 8 per cent for January.

Plant construction work done for the Defense Plant Corporation in December was 3% less than in the previous month, while machinery and equipment deliveries in this category increased 8%. Notable increases by individual type occurred at synthetic rubber plants, where the construction volume in December was three times as great as in November.

Petroleum Reserves Rise

American Petroleum Institute's Committee on Petroleum Reserves estimates that proved reserves of crude oil in the United States as of Dec. 31, 1942 amounted to 20,082,793,000 barrels, which is 493,497,000 barrels higher than its estimate of January 1, 1942 of 19,589,296,000 barrels.

Business Indicators

Orders for tin plate and steel were arriving more rapidly than in past weeks. Steel mill production of ingots and castings reached 1,716,100 tons, highest weekly total this year and third largest weekly production in history. Tin plate mills, under government quotas, held operations close to 50% of capacity.

Electric power production rose from 3,892,796,000 to 3,946,630,000 kilowatt-hours. Daily average crude oil output expanded to 3,887,200 barrels. General business indicators registered a decline for week of March 12. Freight carloadings dropped and bank clearings fell off. Retail sales also declined with unfilled orders at a peak.

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U.S.I. CHEMICAL NEWS

March ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1943

U.S.I. Establishes New Department for Technical Problems

Will Aid Customers, Explore Potentialities of Products

A Technical Sales Development Department has been established by U.S.I. for the joint purpose of furnishing customers with a technical field service that can aid them in the solution of their problems and of providing the means for a more intensive exploration of both new and old products. The headquarters of the department have been located in a newly constructed laboratory building.

Dr. D. G. Zink will act as director of the new department, A. J. Fisher, Jr., as assistant director, and Norman C. Schultze as chief chemist.

Specifically, the proposed work of the department has been outlined as follows:

1. Investigation of suggestions for new products and their application.
2. Development of new uses of existing products.
3. Furnishing technical field service, including the handling of customers' problems.
4. Study of industrial trends.

The activities of this department will be controlled by a committee comprising Dr. F. J. Metzger, Director of Research; W. O. Griffen, General Production Manager; L. A. Keane, General Sales Manager; Dr. Zink and Glenn Haskell, president of U.S.I., who will act as chairman.

Agar Easily Recovered From Culture Media

A simple procedure for recovering agar from culture media was described recently which was said to provide as satisfactory an agar as the fresh commercial product.

The used media is autoclaved for sterilization purposes and filtered through cheese-cloth to remove coagulated proteins. It is then poured into trays from the freezing compartment of a refrigerator and allowed to cool. The trays are returned to the freezing compartment and left overnight. The following morning, the frozen material is rapidly melted in warm alcohol. The aqueous alcohol, containing the particles of agar, is filtered with cheese-cloth and the agar thus collected washed repeatedly with distilled water. Dehydration of the agar is produced by washing with alcohol.

Acetoacetanilide Used in Making Synthetic Resins

PITTSFIELD, Mass. — Acetoacetanilide, widely used as an intermediate in the production of yellow pigment dyestuffs, has potential utility also in the manufacture of synthetic resins for plastics and coatings.

This fact is revealed in a recent patent granted to an inventor here. In general, the new resins are prepared as condensation products of acetoacetanilide and an aldehyde. Modifying reactants may be included, such as urea, acetamide, or melamine, it is claimed.

Acetoacetanilide is produced by U.S.I.

Glycerol by Fermentation Made Practicable by U.S.I. Research

Commercial Exploitation of New Procedure Will Provide Additional Supply Sources for This Vitally Needed Material

The wide industrial utility of glycerol, as outlined in the first article on this series in the February issue of U.S.I. CHEMICAL NEWS, coupled with the heavy demand for this material in the manufacture of explosives, serves to indicate the urgent need for a source supplementary to the principal one, which is the saponification of natural oils and fats. Other than the production of glycerol by saponification of fats or by chemical synthesis, the most promising source is fermentation.

Use of "Steering Agents"

With respect to this, it has been known for many years that the normal fermentation of sugar by yeast results in the formation of glycerol to the extent of about 3% of the sugar along with the ethanol which is the main product of the fermentative activity. In recent years it has been found possible to modify the fermentation in various ways so as to increase the relative amount of glycerol. The modifying substances added have been appropriately called "steering agents," and it is a comparatively simple matter to increase the glycerol some five or six fold by adding suitable chemicals to the fermentation. The activities of the yeast may also be steered in the direction of glycerol formation by certain purely physical modifications in the fermentation solution. This knowledge was utilized by the Germans during World War I to manufacture considerable amounts of glycerol by fermentation for use in explosives.

Practical Difficulties

The problem of producing fermentation glycerol has been studied for some years by the Research Staff of U.S. Industrial Chemicals, Inc. This study has been designed to find means of obtaining glycerol from molasses fermentation, since molasses is the principal commercially practical source of the sugar necessary for the process. However, when molasses is used with appropriate steering agents, the recovery of the glycerol produced becomes difficult, because of the fact that after

(Continued on next page)

G. L. Haskell Is Elected To Presidency of U.S.I.

NEW YORK, N. Y. — Glenn L. Haskell, first vice-president and director of the company for many years, was named president of U.S. Industrial Alcohol Co. at a recent meeting of the board of directors to succeed Charles S. Munson who was appointed chairman of the executive committee.

Glenn L. Haskell

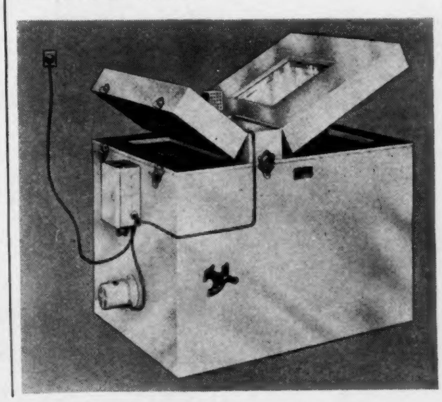
Vice-president in charge of sales since 1927, Mr. Haskell joined U.S.I. in 1921, holding successively the posts of Western sales manager at Chicago and general sales manager at New York. He was born in Chicago in 1883 and began his business career in 1900 with the American Distilling Co.

Portable "DRY-ICE" Cabinet Developed for Refrigeration

SILVER SPRINGS, Md. — A constant temperature "DRY-ICE"* cabinet has been developed for use where expensive mechanical refrigeration would not be justified, which is said to provide temperatures from minus 90° F. to 220° F. with a constancy of plus or minus ½° F.

The cabinet is described as portable and ready for operation after packing with "DRY-ICE" and plugging the cord into the current supply. In addition to the type described, a low-temperature model is available with a range from zero to minus 90° F.

* Pure Carbonic, Incorporated, sells "DRY-ICE" manufactured by U.S.I.



Greater Power, No Corrosion Claimed for New Antiseptic

DANBURY, Conn. — A patent for an antiseptic for the sterilization of surgical instruments at room temperature, which is claimed to be non-corrosive in action and several times stronger in germicidal value than formaldehyde compositions previously utilized, has been assigned to a company here. It can be used either as a liquid or as a vapor.

The composition is a strong solution of formaldehyde in combination with a relatively large amount of ethyl alcohol, a small quantity of methyl alcohol and a very small quantity of a compound containing a reducing anion. A small quantity of an alkalizing agent may also be included.

A typical formula for this antiseptic follows:

U.S.P. formaldehyde (40%)	20%
Ethyl alcohol (96%)	69.5%
Sodium nitrite	0.1%
Sodium hydroxide	0.025%
Ethyl alcohol, specially denatured, (formula No. 30—100 parts ethyl alcohol, 10 parts methyl alcohol)	10%

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New Glycerol Process

(Continued from preceding page)

removal of alcohol by standard distillation procedures, the glycerol has to be separated from stillage containing a relatively large amount of solids other than glycerol. These solids are made up of an assortment of chemical entities of widely differing nature derived from the cane juices and are not easily separated from the glycerol.

U.S.I. Procedure

U.S. Industrial Chemicals, Inc., has developed through the pilot plant stage a process for the manufacture of glycerol from molasses. A modification of the fermentation procedure has been worked out that considerably increases the amount of glycerol formed.

In addition, U.S.I. has a proven process for the recovery of the glycerol from the other sugar solids — and for the final purification to produce dynamite or C.P. glycerol. At the present time, however, the critical materials required for such a project are needed more urgently for other purposes. It is obvious that when they are available, the commercial operation of a process for turning out glycerol from a source other than fats would remove the danger of a shortage by making possible rapid expansion of production of the fermentation glycerol to meet necessary war and civilian demands. Fermentation glycerol is our insurance against shortage of nitroglycerine for explosives.

Describes Preparation Of Multitone Coatings

BROOKLYN, N. Y. — The phenomenon of "blushing" in lacquers — usually a condition to be avoided — can be turned to advantage in the production of multitone coatings, it is claimed by an inventor here.

According to the patent issued on the process, a coating composition that will produce a blushed film is prepared and applied to a surface. If the film is treated with an embossing roller, a partially clear film is produced at some points, while the original blush remains elsewhere, thus resulting in the multitoned effect.

The coating may consist of:

	Parts by weight
Nitrocellulose	13.8
Acetone	5.0
Methanol (C.P.)	74.4
Water	4.2
Glycerol	2.6

New Federal Specification Issued for Lacquer Thinner

WASHINGTON, D. C. — A new federal specification on lacquer thinner (E-TT-T-266) has been issued to allow the use of aliphatic hydrocarbons instead of coal tar and aromatic petroleum hydrocarbons. In order to make this possible, the ester content has been changed from 25-35% to 30-40%, the coal tar and petroleum hydrocarbons, 40-50% to petroleum hydrocarbons 30-40%.

A suggested formulation is butyl acetate 26, ethyl acetate 8, methyl ethyl ketone 15, butanol 12.5, petroleum naphtha 38.5.

Ethanol Said to Improve Dehydrated Castor Oil

CHICAGO, Ill. — The treatment of heat bodied dehydrated castor oil with low boiling alcohols, preferably ethanol, will substantially reduce the acid and acetyl value of such oils and make them suitable for highly water-resisting varnishes, an inventor here claims.

The smallest ratio of ethanol to oil that was found desirable from a practical standpoint was four volumes of ethanol to one of oil. According to the inventor, the only upper limit of ethanol is that dictated by considerations of cost and of the capacity of the handling equipment.

Improved Method Developed To Clean Slides, Coverslips

NEW YORK, N. Y. — A new method for cleaning glass slides and coverslips has been developed here which is claimed to give excellent results, it was reported recently in "The Chemist-Analyst."

The steps to be followed are: soak the used slides and coverslips in xylol for several days; rinse with 95% alcohol for a few minutes; rinse for a few seconds with acidified alcohol (1% HCl in 70% alcohol); and soak in 95% alcohol again; and wipe dry with a clean cloth.

Alkalis in Glass Determined With Denatured Alcohols

HARTFORD, Conn. — Tests conducted here recently show that alcohol denatured with 10% ether (formula SD13A) and alcohol denatured with 10% acetone (formula SD23A) are satisfactory substitutes for 95% alcohol in the determination of sodium and potassium in glass.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Protective clothing has been designed to supplement the use of creams and liquids in operations where the exposed skin is subject to abrasive action or where the protection of clothing is of prime importance, it is said. **(No. 670)**

U S I

A new organic alkyl peroxide, t-butyl hydroperoxide, is available commercially which is reported to be suitable for use as a catalytic agent in one or two phase polymerizations, an oxidation agent, a drying accelerator, a combustion accelerator and a bleaching agent. **(No. 671)**

U S I

An acid siphon has been developed for dispensing corrosive liquids from carboys and drums. Made of a semi-flexible plastic impervious to ordinary commercial acids and alkalis, the siphon is said to produce a clean, easily controlled flow. **(No. 672)**

U S I

A substitute for carnauba wax in no-rub polishes is offered which the maker says can be used in amounts as high as 80% while still retaining gloss and other necessary properties in the polish. Available in quantities without priorities, the product is described as a processed type requiring no further processing. **(No. 673)**

U S I

Surface active agents have been developed which are described as non-electrolytes, which are neither sulfates nor sulfonated products and are essentially free from soap, excess fatty acids and inorganic salts. **(No. 674)**

U S I

A synthetic beeswax is now being produced which is claimed to be uniform in quality and to have all the characteristics of the genuine product. Available without priorities, it is said to be an excellent emulsifier and to be free from harmful ingredients. **(No. 675)**

U S I

Five skin-protective creams are said to be useful for protection against dust, sticky compounds, irritants with low water content, strong and dilute acids and alkalis, coolants with more than 10% water, ultra-violet and infra-red rays, and as for general skin conditioning. **(No. 676)**

U S I

A plastic molding material of unusual impact strength is said to have been developed through the use of a fibre filler which provides uniform load distribution. Impact breaking strength is rated at 3.2 to 4 ft. lb.; tensile strength at 6,000 to 7,000 lb. per. sq. in.; and flexural strength at 12,000 to 13,000 pounds. **(No. 677)**

U S I

Lacquers for spray application on wood, metal, plaster, plastic and composition surfaces are offered which are claimed to produce a finish that resembles metal plating. **(No. 678)**

U S I

A static charge meter has been put on the market for testing the resistance of a worker to ground in plants where there is danger of explosion due to static sparks. It consists of a resistance meter with its scale shaded to show safe and unsafe zones, a floor plate on which the worker stands, and connecting leads between the plate and the meter. **(No. 679)**

U.S. INDUSTRIAL CHEMICALS, INC.

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- Butyl Oxalate
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- Amyl Phthalate
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- Ethyl Phthalate

OTHER ESTERS
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- Ethyl Carbonate
- Ethyl Chloroformate
- Ethyl Formate

INTERMEDIATES
- Acetoacetanilide
- Acetoacet-ortho-anisidide
- Acetoacet-ortho-chloranilide
- Acetoacet-ortho-toluidide
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- Curbay X (Powder)
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- Indalone
- Nitrocellulose Solutions
- Potash, Agricultural
- Urethan
- Vacatone

INDUSTRY'S BOOKSHELF

Manual of Explosives, Military Pyrotechnics and Chemical Warfare Agents; composition, properties, uses, by Jules Bebie, MacMillan Co., N. Y.; 171 pp., $2.50. Reviewed by Frederick A. Hessel.

THIS CONCISE dictionary is a welcome and much needed addition to the literature on explosives. Recent books available on this subject are none too plentiful in spite of the pressing importance. The "Manual" is also particularly timely for right now there is an urgent need to train technical men in large numbers as quickly as possible and this book will be a real time saver.

The introduction includes a brief chronology of explosives. This is followed by a short but clear description of the composition, properties and uses of the various components of explosives and chemical warfare agents. In the case of the principal war gases, means of protection are added. Trade names and chemical warfare symbols are cross indexed and a short bibliography of recent books, bulletins, trade pamphlets, periodical articles and patents has been included.

So plain is the language used and so easily understandable, that the book will be a practical guide not only for technical men but also for laymen as well. As a matter of fact, the latter will find it a very good introduction to the study of modern warfare.

It is regrettable, in the humble opinion of this reviewer, that Dr. Bebie who writes so lucidly on such a complicated subject, did not enlarge his introduction. More details on the general chemistry of explosives would add to the already considerable value of the book.

Business as a System of Power, by Robert A. Brady, Columbia University Press, N. Y.; 340 pp., $3.00. Reviewed by R. L. Taylor.

"THE CASE for government control of industry" might have been the subtitle of this book, for that is what it is, and a thought-provoking one at that.

The author builds his main argument around the old thesis that in any industrial nation there is a natural tendency for big business to dominate national economic, social and eventually political policies if not opposed by strong counteracting government controls. If outside regulation and controls are weak, as they were in Germany after the first World War, business tends to become self regulating through trade agreements, cartels and trade associations, reasons Dr. Brady, thus developing monopoly practices and "regimentation without leadership and arbitrary power without control." Such was the condition in Germany that gave rise to a dictatorship backed by industry, he states.

"Nothing fundamental in history, program, organization or social outlook divides clearly the policies of the Spitzenverbände (federated trade associations) within the "totalitarian" countries from those of the liberal-capitalist states (U. S. and Britain). Within Germany, Italy, Japan and France these bodies made the critical decisions without which the final destruction of democracy could not have taken place. Is it possible that the lesson will be learned elsewhere before it is too late?" Government control of business, or else, is the theme.

Most business men will find points of agreement as well as disagreement in Dr. Brady's reasoning and interpretations. Not of least interest are the histories of the evolution and influence of manufacturing associations in Germany, France, Italy, Britain and America. One wonders, however, if the author's acknowledgment of "expert" assistance received in the preparation of the section on the American associations is any indication of the source of his advice on the others. The American experts were limited to the La Follette Committee and the Department of Justice.

The Chemical Aspects of Light, by E. J. Bowen, Oxford University Press, N. Y.; 191 pp., $4.00.

IN PHYSICS and chemistry objects of extremely small size are studied as idealized forms whose behavior can be expressed by mathematical equations. The author of the book has presented those concepts found useful in understanding theories of light while omitting the more formal mathematical solutions verifying the choice of concept. The work, therefore, is intended for the non-specialist who wishes to know something of this branch of contemporary science but is not equipped to solve complex mathematical problems.

First three chapters cover the elements basic in theories of waves and matter, light and light sources, and absorption and emission of light. Rapidly reviewing the physical aspects of light, these introductory chapters barely mention the ultramicroscope and the electron microscope. The remainder of the book is directed towards topics of special chemical interest including the interrelations of scattering, Raman and fluorescence radiations, quenching of fluorescence, phosphorescence, modern theory of the photographic plate, chemiluminescence and photo-chemistry.

Most students with background study in general mathematics and the physics of light as well as inorganic and organic chemistry will find Mr. Bowen's laconic treatment a memory refresher. The advanced chemical aspects of light are, unfortunately, not discussed in sufficient detail and one looks forward to a future, more intensive coverage of this expanding field.

The Chemistry of Natural Coloring Matters, the constitutions, properties, and biological relations of the important natural pigments, by Fritz Mayer, translated and revised by A. H. Cook. Reinhold Publishing Corp., N. Y.; 354 pp., $10.00.

ANOTHER in the American Chemical Society Series of Monographs, this reference volume surveys the chemical relations known to exist among natural compounds which possess visible color, incorporating research findings up to the summer of 1941. The author divides his topic into cartenoids (polyene pigments), diaroylmethane, carbocyclic, and heterocyclic compounds and heterocyclic nitrogen atom containing compounds. Under each classification are listed the occurrence, composition, chemical and physical properties, and method of production of the individual pigments.

Of special interest to the research chemist are the hundreds of specific references to more detailed material which point the way for future investigations. As Dr. Mayer says in his introduction, "It is regrettable that even today we remain almost completely ignorant of the methods by which these pigments are elaborated by nature." Paralleling the problem of chemical synthesis is that of biological significance for "although biological relations are mentioned only in passing, they probably constitute the outlines of the picture of organic chemical thought of the future."

Feigl, Fritz. Specific and special reactions for use in qualitative analysis, with particular reference to spot test analysis. Translated from a revision of the third German edition. New York: Elsevier Publishing Co., Inc., 1940. ix, 192 p., diagrs., tables. $3.50. Reviewed by T. E. R. Singer.

PROFESSOR FEIGL'S volume represents the theoretical part of the author's "Qualitative Analyse mit Hilfe von Tüpfelreaktionen" in English translation. The author has endeavored to collect, from the literature and his own studies, all the facts important not only to the familiar theoretical bases of analytical chemistry, but which, in addition, are of peculiar significance to the special field of sensitive and indisputable detection reactions.

CANADIAN REVIEW

By Kenneth R. Wilson

OTTAWA—Canada's entire wage and price stabilization program has been threatened in recent weeks by a settlement made by the Dominion cabinet itself with 13,500 striking steel workers in Sydney, N. S., and Sault Ste Marie, Ont.

Wages in Canada's big steel plants have been under discussion for over a year. Last year, provincial wage boards in both Nova Scotia and Ontario refused an increase in basic wage rates on the ground that such an increase was contrary to the government's wage stabilization order under which all Canadian industry has operated since November, 1941. The steel workers were not satisfied, and a Royal Commission was appointed to look into the whole matter. That Commission brought in its report early in January and shortly after, the men went on strike. A majority of the Commissioners reported against a wage increase and a minority of one dissented.

K. R. Wilson

Because of the urgent need for steel, the Canadian Prime Minister and his cabinet decided to meet the C.I.O. union representatives personally at Ottawa. Out of these meetings came a settlement which it is believed cuts at the very root of the wage-price ceiling program. How far this settlement has gone towards undermining this program is not yet clear.

The reason this settlement plan is regarded as so disturbing is that it grants to workers at both Sydney and Sault Ste Marie a new basic wage rate of 55 cents an hour. This is an increase of 11½ cents per hour in the case of the Dominion Iron and Steel and Coal Co., plant at Sydney, and an increase of 9½ cents for workers at the Algoma Steel plant at the Sault.

Under the Canadian wage stabilization program, the men at Dosco were receiving a basic rate of 43½ cents plus a cost of living bonus of 9 cents or a total of 52½ cents per hour. The Algoma workers were receiving a basic wage rate of 45½ cents plus a cost of living bonus of 5 cents, or a total of 50½ cents. The new basic rate is 55 cents for both plants and workers are granted the right to apply for a cost of living bonus over and above the 55 cents rate.

No evidence was submitted to the provincial boards, the Royal Commission, or to the Prime Minister, to show that wages paid in these plants were out of line with prevailing wages. On the contrary it was indicated that steel workers' wages in these plants were generally high compared with comparable wages in other plants or areas. Therefore the fact that the Prime Minister and his cabinet deliberately overruled the earlier wage policy and raised basic wages even higher than the combined total of the old rate plus the cost-of-living bonus, is viewed generally with considerable alarm.

The negotiations for the workers were carried on through the C.I.O. union. The union is now seeking a ruling as to whether the steel workers are entitled to a bonus over and above their new basic wage. They have also been granted the right to have the steel industry in Canada treated as a "national" industry from the viewpoint of wage negotiations. Previously all plants have been treated regionally and their grievances settled by provincial wage board. The implications of a single national structure for the Canadian wage steel industry are in themselves highly important.

Trend Toward Unionization

Following the considerable success of union organizers in obtaining special consideration for the steelworkers, there has been a country-wide trend towards union membership in both war and peacetime industry. Till now, union organizers have been able to offer their potential membership very little prospect of higher wages. Now the lid seems to be off, although the statutory authority (National War Labor Board) has been reconstituted under a new chairman and every effort will be made to prevent a new crop of wage increases such as would undoubtedly upset the overall price ceiling policy.

Were it not for this distrubing development on the wage front, the managers of Canada's price ceiling policy would be feeling a bit encouraged. They have just succeeded in dropping almost 2 full points off the cost of living index and thus avoiding the payment of a new and additional cost of living bonus to most Canadian wage earners. Such a bonus would seem automatic had the index risen by a full point between October, 1942 and January, 1943. It would have brought further and possibly dangerous pressure on the price ceiling.

Payment of this bonus was only avoided by the entirely new policy announced last December, of deliberately lowering the price of milk, tea, coffee and oranges by means of a government subsidy. The government believes it is cheaper to pay such subsidies (in this case the cost to the treasury is placed at about $40 millions a year) rather than run the risk of putting a new secondary wage-price inflationary cycle in motion.

U. S. price ceiling policy is being watched with an eagle eye because of the indirect threat which any runaway inflation in the U. S. would have on Canadian policy. Donald Gordon is shortly planning to call on Prentiss Brown in Washington and if the same degree of cooperation can be established as was the case with Leon Henderson there will be more assurance here that the two countries will yet find agreement in working along more or less parallel lines.

Canadian war industry is already beginning to foresee the gaunt shape of postwar curtailment with all its complex and ominous implications. Already, because of oversupply and the changing tempo of modern warfare, many British war contracts placed in Canada have been cancelled and thousands of workers have had to be switched from one type of war work to another. There have been reports that a number of U. S. contracts in Canada have also been cancelled and that Canadian firms will have less steel from the U. S. in the second quarter of 1943.

To Canada, this new trend is specially ominous since 70% of Canadian war production in 1942 went to either Great Britain or the United States. Canadian manufacturers fear this country may have a postwar unemployment problem on its hands a year before either Britain or the United States, since the natural tendency in light of increasing raw material shortage, will be to keep war industry in both U. S. and U. K. busy in preference to renewing orders in Canada.

That is one reason why Canada attaches especial importance to its new Mutual Aid program announced in February. This program is a modernized and streamlined version of Lend-Lease. It sets aside a billion dollars for the purchase of war materials, food stuffs and raw materials to be distributed to other United Nations on the basis of "strategic need." There are no unknown postwar strings attached to the gift and the chief requirement for distribution will be "effective use" in the common cause.

Under this Mutual Aid program, Canada will henceforth distribute surplus war production direct to China, Russia, Britain, Australia, New Zealand, South Africa, and even to the United States.

MARKETS IN REVIEW

ON the whole new business in industrial chemicals is rather quiet but producers are moving large volumes on earlier commitments. War industry and Lend-Lease continue to be the most important factors in the market. Agricultural demands also continue quite strong although the seasonal demand for mixed goods is well under way. The emphasis placed on urging farmers to enlarge their production of foods as much as possible means that the supply of chemicals for agricultural purposes will not be able to fulfill the demands.

Heavy Chemicals: The War Production Board's Chemicals Division, after a month's observance of its new controls over tank car and tank truck movements ot a number of liquid chemical products, is expected to extend the transportation controls in a new order covering a number of so-called "dry" chemicals including soda ash, caustic soda, potash, borax and others.

Unlike order T-1 which provided for definite cross-haul bans and tank car limitations, this second order is expected to take the form of a "transportation request" which would rationalize box car movements of chemicals according to pooling arrangements and zoning plans worked out by manufacturers and distributors and subject to approval by the War Production Board.

Substantial shipments of copper sulfate are going to the agricultural trade this month and there is an expectation that the demand will continue through April.

Order M-227 issued by the WPB restricts the delivery and use of copper chemicals and puts allocation on a quarterly basis instead of a monthly schedule.

Calcium chloride producers were still reported to be running behind on deliveries but it was felt that they soon would be able to catch up on deliveries because of the expected seasonal slackening in demand.

During the winter consumption of this material has been unusually large, mostly because of heavy demand for war uses and also because of the increased amount used in treating coal which has been used in larger amounts on account of the oil shortage.

Phosphates continue difficult to obtain even though buyers were willing to pay premium prices. According to certain sources, the difficulty in this situation is a shortage in the basic material from which the phosphates are made rather than to an increase in consumption.

The acetic acid market is reported to be very active, with demands absorbing everything that is produced. In spite of the fact that plants are running at capacity all grades of acetic acid are extremely scarce as far as spot buying goes.

Sodium chlorate is in brisk demand with expectations that as the agricultural season advances the demand will grow as great quantities of this are used in weed control. Distribution is in the hands of the Department of Agriculture and it is likely that all consumers will be taken care of.

The consumption of chlorine is growing and is expected to go ahead at a more rapid rate during the months ahead as larger quantities will be needed for treating water and sewage in the spring and summer months. This points up the fact that it may be necessary to limit still further non-essential uses.

Export demand for heavy chemicals remains large, but little fulfillment is being made as it is almost impossible to obtain shipping space.

Fine Chemicals: There was very little price movement in the fine chemical market during the past month. However, manufacturers reported a brisk demand generally and the market as a whole had a very strong tone. The majority of manufacturers are booked well ahead and it is felt that it will take several months for them to catch up on deliveries provided the demand doesn't continue so strong as it has been during the fall and winter.

Menthol continues to excite interest since the Far-East supply has been shut off for more than a year and stocks are just about depleted. The OPA has set ceilings on menthol at about $14.50 to $15.00 and it is said in some quarters that this has discouraged production from American peppermint oil which sells at too high a price to make an economical raw material for production of menthol unless the menthol price ceiling is increased considerably.

The Office of Price Administration on February 28th issued Amendment No. 2 to Maximum Price Regulation No. 295, permitting an increase in the price of ethyl alcohol on the West Coast. Because of a rise in the cost of molasses and information showing that costs of West Coast alcohol producers are high, an increase of five cents a gallon in the basic maximum price was allowed, for all manufacturers in the states of Washington, Oregon, and California, with the exception of one company.

Sulfa drugs and synthetic vitamins are in great demand and all of the production is moving out rapidly, particularly to fill outstanding orders of military and other government agencies.

The present and prospective situation with regard to glycerine has become quite critical. Allocation orders have drastically curtailed the use of glycerine in many essential and practically all non-essential products. Even this tighter control is not expected to cope with the situation and the WPB is making efforts to increase production. One means to be tried is a more determined effort to collect waste fats and oils especially from homes and restaurants.

It is believed by some people in the trade that the complete curtailment of glycerine for cosmetics and toilet goods is an indication that various other raw materials will be denied.

The citric acid market continues active as large shipments move out against a backlog of orders, mostly from government agencies.

Salicylates are going to regular consumers in fair quantity but, because of government regulations and a tight market on the whole, it is next to impossible for anyone who has not previously been a consumer to get supplies.

Agricultural Chemicals: The great emphasis being placed on increasing the production of foodstuffs continues to activate the demand for chemicals that go into manufacture of fertilizers and other agricultural uses.

More ammonium sulfate, sodium nitrate and liquid ammonia is being allocated to fertilizer manufacturers by the WPB and will ease the situation somewhat. However, another serious problem has developed in the industry. This has to do with the shortage of manpower. The ordinarily lower wages in this industry has resulted in a shift of workers to other higher paying industries and this together with the general scarcity of manpower has resulted in a problem that is expected to become more acute.

The inorganic nitrogen picture was considerably eased by the increase in allocations of various forms of inorganic nitrogen to the fertilizer manufacturers, especially the release of ammonia liquors. Another important factor here was the release from Canada of considerable quantities of ammonium nitrate in the form of a mixture containing 34% of nitrogen associated with limestone.

The situation in organic nitrogenates remains bad. Although certain quantities of oil meals are authorized for mixing of fertilizer, supplies are scanty and manufacturers are not able to secure material to fill their needs. This may prove particularly serious when manufacturers need material to complete final mixes.

It is expected that there will be sufficient potash available in this country for most needs. During the past month some additional shipments of muriate of potash

have been received from Russia, but the amount is a very small percentage of American production.

Lend-Lease shipments have left superphosphate extremely scarce and this picture will continue until deliveries have been completed. There is some hope that the British may be able to secure supplies of phosphate rock from North Africa and convert it into triple superphosphate to relieve the drain on American production.

Coal Tar Chemicals: Practically all intermediates remain in brisk demand. Production is not able to keep up because of channeling of basic raw materials into certain essential war products.

Refined naphalene situation bears watching as more and more crude naphalene is being used to produce phthalic anhydride and little will probably be left for other purposes.

Paradichlorobenzene is quite scarce because of shortage of chlorine and because emphasis is being placed on monochlorobenzene which is used in production of picric acid.

Cresylic acid situation remains serious. Domestic consumption is greater than domestic production and imports from Great Britain, which usually has an excess, have not lived up to expectations. One of the main reasons for the trouble is the price ceiling in this country which discourages British exporters to ship material. Apparently they are holding out for higher prices. It is understood that discussions have taken place in Washington, with a view toward increasing the price ceilings and if action is taken it is likely that imports will be stepped up.

Benzol is still being siphoned off to build a government stock pile which will be used as the demands from the synthetic rubber and aviation gasoline programs increase.

Naval Stores: The naval stores price situation fluctuated as usual during the past month with a slight upward tendency.

Important news for the industry came in a statement from the Commodity Credit Corporation that there will be no naval stores distributors agreement for 1943. It was felt by the corporation that in view of the greatly improved conditions with regard to gum naval stores, especially rosin, that no agreement is needed.

The position of rosin was said to be increasingly strong with expectations of expanding demands and possibly a smaller crop in the coming season.

Demands for turpentine continued small and a disappointing outlook was seen for this commodity.

Allocations: The War Production Board made public, March 8, the monthly distribution of chemicals for March under the allocation orders of the Chemicals Division. These chemicals amounted in value to approximately $93,000,000 for the month, of which $39,000,,000 or 42 per cent entered directly into identifiable military production. This is an annual rate of $1,116,000,000 for the total, and $468,000,0,00 for military.

Tabulated below by percentage are the civilian end-uses to which some of the various chemicals under allocation were allotted. The percentage figures show the relationship between the amount requested and the amount allotted.

Acetic Anhydride. Granted in full for cellulose acetate staple fibre, cellulose acetobutyrate, cellulose acetopropionate, synthetic casein fibre, triacetin and diacetin, aspirin, acetanilid, acetophenetedin, other pharmaceuticals, synthetic vitamins, cation softeners—textile processing agents, synthetic flavoring, perfume bases.

Granted in part for cellulose acetate plastics and film (68%), intermediate dyes (99%), laboratory reagents and research (95%), and cellulose acetate yarn (77% of monthly consumption during third quarter of 1942).

AMMONIA, ANHYDROUS. Granted in full for activated carbon, agriculture, amines, chemical manufacturing, dry cell batteries, dye intermediates and dyestuffs, industrial explosives, export, films and photographic chemicals, food processing, insecticides, metal treating and nitriding, nitrous oxide, petroleum, plastics and synthetic resins, rayon manufacturing, refrigeration, resale, silica gel catalyst, sufuric acid, textiles, and water treatment.

Granted in part for nitrocellulose (91%).

AMMONIUM SULFATE. Granted in full for agriculture, export, alcohol, cellulose, dyes and pigments, fire retarding, insulation, leather bates, rayon, textiles, and yeast.

ANILINE. Granted in full for all uses for which it was requested.

CAFFEINE. Granted in full for medicinals, except where inventory was excessive. Granted in part for beverage use (approximately one-third of average monthly 1941 consumption adjusted for inventory, materials obtained on toll agreement and doubtful importations).

CALCIUM CARBIDE. Granted in part for resale (79%) and for export (20%).

CALCIUM HYPOCHLORITE. Granted in part for civilian uses (67%—mainly water purification and sugar refining).

CHLORINE. Chlorine was allowed in full for all uses (subject to other orders of the War Production Board) except where inventories were excessive—or would be excessive by virtue of deliveries. Adjustments were made to request when they were excessive in comparison with past consumption.

COPPER CHEMICALS. Allocations were based upon the restrictions to a practical minimum working inventory based on stocks as shown on consumers PD-600 forms.

In case of certain non-essential uses allocations were halved or denied, pending further investigations of essentiality of end products.

DICHLORETHYL ETHER. Granted in part for laboratory and experimental (15%). Denied for insecticides and cleaning compounds and for anaesthetic.

GLYCERINE. Glycerine was allocated as follows:
(a) Drugs and pharmaceuticals: capsules and suppositories—100% of requests: basic chemicals—100% of requests; miscellaneous—60% of base period consumption.
(b) Explosives—100% of requests.
(c) Synthetic resins (the M-139 and M-246)—100% of requirements.
(d) Ester gums—100% of requirements.
(e) Rubber—100% of requests.
(f) Gaskets and Cork Products. crown liners—25% of base period consumption; gaskets and all others—80% of requests.
(g) Cellulose films: cellophane—38% of base period consumption; meat casings—50% of requests; caps and bands—50% of base period consumption.
(h) Glassine and greaseproof paper: glassine—70% of base period consumption; greaseproof—70% of base period consumption.
(i) Printing supplies—50% of base period consumption.
(j) Printers' rollers—90% of base period consumption.
(k) Textiles: dye manufacturing—100% of requests; processing textiles—40% of base period consumption; rayon—100% of requests; textile oils and cutting oils—50% of requests.
(l) Leather—40% of base period consumption.
(m) Adhesives: flexible glue—60% of base period consumption; tablets and pads—none; shoes—100% of requests; coating compounds—60% of base period consumption; miscellaneous—60% of base period consumption.
(n) Paper other than glassine and greaseproof: sensitized—100% of requests; leather substitutes—100% of requests; all other—50% of base period consumption.
(o) Beverages, flavoring extracts, etc.. flavoring extracts—none; candy, gum, soft drinks,—none.
(p) Other edible products: margarine—100% of requests; shortening—none; others—none.
(q) Tobacco—50% of requirements, use from inventory—last allocation.
(r) Cosmetics, dentifrices, toilet preparations: dentifrices—25% of base period consumption; shaving creams—25% of base period consump-

tion; shampoos, hair tonics—none; hand and face lotions—25% of base period consumption; soap —none.

(s) Miscellaneous: triacetin and diacetin—100% of requests; surface tension modifiers—50% of base period consumption; cutting oils—50% of requests; cements, paste, etc.—100% of requests; lubricants—100% of requests; fluids—100% of requests; plasticizer—70% of base period consumption; packing compounds—100% of base period consumption; reconstructed oils—70% of base period consumption; welding electrodes—100% of requests; soldering flux—100% of requests; research—100% of requests.

NOTE: In some instances glycerine was denied for a specific end use where it has been determined that substitutes were available.

GLYCOLS. Ethylene glycol was granted in full for civilian usage except for anti-freeze requests which were made in accordance with previously established quotas. Diethylene glycol was granted in full for all uses except cosmetics and tobacco. The grants in tobacco were made in accordance with previously established quotas and cosmetics were restricted in accordance with plans set down by the Drugs and Cosmetics Section of the Chemicals Division. Triethylene glycol was granted only for research along with small quantities for miscellaneous chemical uses. Mixed glycols were granted for anti-freeze in accordance with the quotas previously set up. Increased requests for propylene glycol as glycerine substitute made it necessary to cut back on food, flavor and cosmetic uses. Tobacco humectant was allocated in accordance with quotas previously established. All requests for glycols were adjusted for excessive inventory and inflated demand.

LITHIUM COMPOUNDS. In the allocation of lithium compounds for the month of March it was possible to fulfill all essential civilian needs 100% with the exception of medicinals. It was impracticable to produce certain of the compounds requested for medicinal use this month, and therefore only 80% of the total request could be met. No allocation was made to less essential civilian uses, such as soft drinks and beverages.

META PARA CRESOL AND CRESYLIC ACID. Granted in part for medicinals other than salicylates (89%), disinfectants and preservatives and insecticides (4%), and dyes and inks (20%). Denied for all other civilian uses.

METHANOL (Synthetic). Granted in full for hexamethylamine tetramine, dimethyl phthalate, methylamines, methylene chloride, methyl formatate, formamide, acetic acid, brake fluid and ethylene glycol, denaturant, aromatic chemicals, vinyl resins and plastics, nylon, methyl esters (other than those mentioned elsewhere), chemical manufacturing and pigments, drugs and pharmaceuticals, research, anti-freeze (other than auto), embalming fluid, gasoline inhibitors, solvents for phenolic resins, oil additives and lubricating cutting oils, sodium methylate and rubber and synthetic additives.

Granted in part for photographic reproduction (96%), duplicating fluids and inks (55%), extraction and solvent uses (72%), protective coatings (60%) wood stains (90%), dye and dye intermediates (83%), cellulose plastics and cellophane (80%), methyl chloride (63%) and formaldehyde (83%). Denied for dimethyl aniline, automotive anti-freeze and methyl acetone.

NAPHTHALENE. Granted in full for moth prevention and insecticides and dye intermediates other than bete-naphthol. Granted in part for beta-naphthol (88%) and chemical compounds (62%). Granted in full for all other uses for which it was requested other than those mentioned above.

NORMAL BUTYL ALCOHOL. Granted in full for butyl cellosolve.

Granted in part for butyl acetate (45%), hydraulic brake fluids (60%), other butyl derivatives (40%), monobutylamine (74%), photographic and reproduction products (97%), industrial coatings (9%), medicinals and pharmaceuticals (82%), resins and plastics (3%), textiles and coated fabrics (15%), and chemical manufacturing (2%).

PHENOL. Granted in part for medicinal salicylates (70% of 1941 consumption), other medicinals (24%) chlorinated phenols (50%—but none allowed for sapstain control), preservatives (28%), dyes and inks (22%-50% of essential civilian), and chemical manufacturing (60%).

PHOSPHORUS. The following uses for phosphorus were granted in full for the month of March, 1943: pharmaceuticals; matches; dyestuffs; fire retardants; essential foods such as yeast, sugar, cheese, butter, food sanitation and gelatin; activated carbon; dentifrices. In individual cases where reductions were made, requests were inflated or in excess of normal.

Requests for use as acid leavening agents in the form of calcium acid phosphate were granted 100% of normal using as a base period the first eight months of 1942. In the form of sodium acid pyrophosphate, requests were granted 90% of normal using the same base period.

Requests for use in beverages were granted in full on the basis of shipments during 1941. Requests for use in detergents and soaps were cut 50%. While much of this material is of an essential nature, a large portion of the products produced for these purposes, namely sodium phosphates, can and are being produced in unrestricted quantities from raw materials other than elemental phosphorus. For this reason the cut of 50% on production of that portion derived from elemental phosphorus does not represent as severe a cut in the over all production for the industry.

POTASSIUM CHLORATE. Granted in full for mining explosives, metal treating and refining, chemical processing, and pharmaceutical. Requests for potassium chlorate for cosmetics were granted in full from distressed material on hand. Granted in part for fur-dyeing (50%), railroad flares and torpedoes (75%), and matches (90%).

PYRIDINE. Granted in full for sulfa drugs, vitamins, and other civilian uses for which it was requested.

SODIUM CHLORATE. Granted in full for pharmaceutical and medicinal fumigating and disinfecting, metal treating and refining, chemical processing, food processing, textile processing, soot removing (where substantiated by ratings), and mining explosives. Granted in part for cosmetics (50%) and weed killing (95% estimated).

SODIUM NITRATE (Synthetic). Granted in full for agriculture, chemical salts, enamels and ceramics, industrial explosives, glass, heat treating and heat transfer salts, insecticides, metallurgy, nitric acid, pigments and dyes, potassium nitrate and sulfuric acid.

TOLUOL. The March allocation of this extremely critical material shows that for various end uses the following percentages resulted insofar as essential civilian consumption is concerned: dyes and intermediates (3%), solvents (75%—consisted of off-grade toluol for solvent blending), medicinals (58%), adhesives (35%), miscellaneous chemicals (50%), laboratory and research (35%), and miscellaneous uses (11%).

End use and preference ratings were of first importance in determining essentiality of requests. Consumers' inventories and consumption in past months were important factors in each case.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 Jan. 1941 $1.16 - Jan. 1943 $0.91

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Acetaldehyde, 99%, drs. wks. lb.	...	.11	...	.11	.11	.11
Acetic Anhydride, drs. c-l, lb.	...	.11½	.11½	.13	.11½	.13
Acetone, tks, delv (*PC*) ..lb.	...	.07	...	.07	.07	.158
ACIDS						
Acetic, 28%, bbls (*PC*) 100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. ......100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks ......100 lbs.	...	6.93	6.25	6.93	6.25	6.93
Acetylsalicylic, USP, (*PC*) Standard USP ....lb.	...	.40	...	.40	.40	.40
Benzoic, tech, bbls ......lb.	.43	.47	.43	.47	.43	.47
USP, bbls ....lb.	.54	.59	.54	.59	.54	.59
Boric, tech, bbls, c-l,...ton *a*	109.00	114.00	109.00	114.00	108.00	109.00
Chlorosulfonic, drs, wks ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, crys, gran, bbls ..lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs, wks, frt equal (A) gal.	.81	.83	.81	.83	.81	.86
Formic, tech, cbys ......lb.	.10½	.11½	.10½	.11½	.10½	.11½
Hydrofluoric, 30%, wks...lb.	...	.06	.06	.06½	.06	.06½
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks ..lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs ..lb.	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys,						
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	1.75	1.75
22° cbys, c-l, wks .100 lb.	...	2.25	...	2.25	2.25	2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	...	5.00	...	5.00	5.00	5.00
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	5.50	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	6.00	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	6.50	6.50
Oxalic, bbls, wks (*PC*) ..lb.	.11¼	.12½	.11¼	.12½	.11¼	.14½
Phosphoric, 75% USP, ..lb.	.10½	.13	...	.12	.12	.12
Salicylic, tech, wks (*PC*)..lb.	...	.33	...	.33	...	.33
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks ....ton	...	16.50	...	16.50	...	16.50
Fuming (Oleum) 20% tks. wks ....ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls ......lb.	...	.70½	...	.70½	...	.70½
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.131	...	.131	...	.131
Butyl, normal, tks (*PC*) lb.	.10¾	.14¼	.10¾	.14¼	.10¾	.168
Denatured, CD, 14, c-l drs, (*PC, FP*) ....gal. *d*	...	.54½	.54½	.65	...	.65
Denatured, SD, No. 1, tks. *d*	...	.50	.50	.58	...	.53
Ethyl, 190 proof tks....gal	...	11.90	11.90	11.92	8.12	11.92
Isobutyl, ref'd. lcl. drs lb.	...	.086	...	.086	...	.086
Isopropyl, ref'd, 91% gal.	.39	.43½	.39	.43½	.40½	.43½
Propyl, nor, drs, wks gal.	.67	.70	.67	.70	.69	.75
Alum, ammonia, lump, c-l, bbls, wks ....100 lb	...	4.25	...	4.25	...	4.25
Aluminum metal, (*FP*) 100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
Hydrate, 96% light, (A) lb.	...	.15	...	.14½	...	.14½
Sulfate, com, bgs, wks 100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, c-l, bgs, wks ...... 100 lb.	1.75	1.85	1.75	1.85	1.75	1.85
Ammonia anhyd, 100 lb cyl lb	...	.16	...	.16	...	.16
26°, 800 lb drs. delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Ammonium Carbonate, tech, bbls ....lb.	.08½	.09¼	.08¼	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	...
Nitrate, tech, bgs, bbls lb.	.0435	.0455	.0435	.0455	.0435	.0455
Oxalate pure, grn, bbls..lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs (A) ...lb.	.55	.65	.55	.65	.55	.65
Phosphate, dibasic tech, powd, 325 lb bbls ...lb.	...	.07¼	...	.07¼	.09¼	.09¼
Stearate, anhyd. bbls ...lb.	...	.24½	...	.24½	...	.24½
Sulfate, f.o.b., bulk (A) ton	28.20	29.20	29.00	30.00	29.00	30.00
Amyl Acetate (from pentane) c-l, drs, delv ...lb.	...	.155	...	.155	...	.155
Aniline Oil, drs and tks..lb.	.12½	.16	.12½	.16	.12½	.16
Anthraquinone, sub. bbls..lb.	...	.70	...	.70	...	.70
Antimony Oxide, 500 lb. bbls (A) ....lb.	.15	.15½	.15	.15½	.15	.16½
Arsenic, whi, kgs (A) ...lb.	.04	.04¾	.04	.04¾	.04	.04¾
Barium Carbonate precip, 200 lb bgs, wks ....ton	55.00	65.00	55.00	65.00	55.00	65.00
Chloride, delv, zone 1 ..ton	77.00	92.00	77.00	92.00	77.00	92.00
Barytes, floated, bbls, wks ton	...	27.65	.	27.65	...	27.65
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, wks ..lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	(A)	.15	(A)	.15	...	.15
Benzyl Chloride, 95-97%..lb.	.22	.24	.22	.24	.22	.24
Beta-Naphthol, bbls, wks . lb.	.23	.24	.23	.24	.23	.24
Bismuth metal ....lb.	...	1.25	...	1.25	...	1.25

a Powdered boric acid $5 a ton higher; USP $25 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal.

	Current Market		1943 Low	1943 High	1942 Low	1942 High
BlancFixe, Pulp, bbls, wks ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.10	2.25	3.10	2.25	3.10
Borax, tech, gran, bgs ..ton *i*	...	45.00	...	46.00	45.00	46.00
Bordeaux Mixture, drs ..lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.124	.1575	.124	.1575	.124	.168
Cadmium Metal (*PC*) .lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs (A) ......lb.	...	.04¾	...	.04¾	...	.04¾
Carbonate, tech, c-l bgs, ton	18.00	22.00	16.00	20.00	16.00	20.00
Chloride, flake, bgs, lcl ..ton	21.50	25.50	...	21.00	...	21.00
Solid, 650 lb drs, c-l, ..ton	18.00	31.50	18.00	34.50	18.00	34.50
Gluconate, Pharm, drs ..lb.	.52	.59	.52	.59	.52	.59
Phosphate, tri, bbls ....lb.	.0635	.0785	.0635	.0705	.0635	.0705
Camphor, slabs ....lb.	.85	.90	.85	1.65	1.60	1.65
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, Liq, 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) drs, c-l ....lb.	.73	.80	...	.83	.73	.83
Casein, Standard, Dom, grd lb.	.19	.21½	.19	.21½	.15	.30½
Chlorine, cyls, lcl, wks, contract (*FP*) (A) .....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ..lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 llb.	...	1.75	...	1.75	...	1.75
Chlorobenzene, Mono, wks lb.	.05½	.09	.05½	.09	.05½	.09
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls ....bbl.	8.25	9.25	8.25	9.25	7.50	9.25
Cobalt Acetate, bbls (A) lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs (A) ..lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP, PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls.lb.	.19½	.20	.18	.20½	.18	.20½
Sulfate, bbls, wks (A) 100 lb	5.15	5.30	5.15	5.50	5.15	5.50
Copperas, bulk, c-l, wks ..ton	...	17.00	...	17.00	...	17.00
Cresol, USP, drs, (A) ....lb.	.10¾	.11¼	.10¾	.11¼	.10¾	.11¼
Cyanamid, bgs, c-l, frt (A) nitrogen basis ....ton	1.52½	1.62½	1.52½	1.62½	no prices	
Dibutylamine, c-l, drs. wks lb.	...	.61	...	.61	.50	.61
Dibutylphthalate, drs .....lb.	.20	.212	.21	.23½	.21	.23½
Dichlorethylene, drs .....lb.	...	.25	...	.25	...	.25
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, c-l, drs lb.	...	.037	...	.037	...	.037
Diethylamine, drs, wks ...lb.	...	.81	...	.81	.70	.81
Diethylaniline, lb drs ....lb.	...	.40	...	.40	...	.40
Diethylphthalate, c-l, drs ..lb.	.212	.217	...	.22	.21½	.22
Diethyleneglycol, drs lcl. wks. lb.	.14	.15½	.14	.15½	.14	.15½
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Dimethylaniline, dms., cl., lcl. lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs ..lb.	...	.20	...	.20	...	.20
Dinitrobenzene, bbls ......lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls ......lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms ......lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks ....lb.	.15	.16	.15	.16	.15	.16
Diphenylamine bbls ......lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs ...lb.	.35	.37	.35	.37	.35	.37
Ether, Isopropyl, drs ....lb.	.07	.08	.07	.08	.07	.08
Ethyl Acetate, 85% Ester tks, frt all'd .lb.	.107	.110	.11	.12	.11	.12
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Chloride, drs ....lb.	.18	.20	.18	.20	.18	.20
Ethylene Chlorhydrin, 40% lb.	.75	.85	.75	.85	.75	.85
Anhydrous frt all'd ..lb.	...	.75	...	.75	...	.75
Dichloride, cl wks ....drs, E. Rockies dms, cl. ..lb.	...	.0842	...	.0742	...	.0742
Glycol, dms, cl. ....lb.	...	.15½	...	.15½	.14½	.18½
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ferric Chloride, tech, bbls .lb.	.05	.08	.05	.07½	.05	.07½
Fluorspar, 85.5% c-l, (*PC*) ton	25.00	28.00	28.00	32.00	28.00	34.00
Formaldehyde, c-l, bbls, wks (*FP, PC*) ......lb.	.055	.0575	.055	.0575	.055	.0575
Furfural (tech) drs, c-l, wks lb.	.15	.20	.15	.20	.15	.20
Fusel Oil, 10% impurities lb.	.18½	.19½	.18½	.19½	.18	.19½
Glauber's Salt, bgs, wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.28
Glycerin (*PC*) CP, drs, c-l, lb.	...	.18¾	...	.18¾	...	.18¼
Saponification, drs, c-l ..lb.	...	.12¾	...	.12¾	...	.12¾
GUMS						
GumArabic, amber sorts bgs lb.	.14½	.15	.14½	.15	.14½	.24
Benzoin Sumatra, USP ..lb.	.50	.55	.50	.55	.45	.55
Copal, Congo, opaque ....lb.	...	.49½	...	.49½	...	.49½

c Yellow grades 25c per 100 lbs. less in each case. *d* Prices given are Eastern schedules.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

h Lowest price is for pulp; highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case;

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	...	.17⅜	...	.17⅜	...	.17⅜
Singapore, Bold ....lb.	...	.22⅜	...	.22⅜	...	.22⅜
Copal Manila, (A)	...	.15⅓	...	.14½	.14	.14½
Copal Pontianak, bold (A) lb.	...	.22⅜	...	.22⅜	.22⅜	.22⅞
Ester ....lb.	.09½	.12	...	.10	.08½	.10
Ghatti, sol, bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ...lb.	.14	.33	.14	.33	.14	.33
Kauri, N Y (A)						
Brown XXX, cases ....lb.	...	.77	...	.77	.60	.77
B3 ....lb.	...	.22	...	.27½	.18½	.27½
Pale XXX ....lb.	...	.65¾	...	.66	.61	.66
No. 3 ....lb.	...	.22	...	.22	.17¾	.22
Sandarac, prime quality ..lb.	...	.97½	.95	.97½	.95	1.10
Tragacanth, No. 1, cases lb.	3.75	3.80	3.75	3.80	3.50	4.00
No. 3 ....lb.	1.10	1.20	1.10	1.20	1.10	1.20
Yacca, bgs (*PC*) ....lb.	.06	.07½	.06	.07½	.06	.07¾
Hydrogen Peroxide, cbys ..lb.	.16	.18½	.16	.18½	.16	.18½
Iodine, Resublimed, jars .lb.	...	2.00	...	2.00	...	2.00
Lead Acetate, cryst, bbls ..lb.	...	.12½	...	.12½	.12	.13¼
Arsenate, East, drs ....lb.	.11	.12	.11	.12	.11	.12
Nitrate, bbls ....lb.	.11	.12½	.11	.12½	.11	.14
Red, dry, 95% Pb_3O_4, lcl lb.	.09½	.10¼	.09½	.10¼	.09	.10¼
97% Pb_3O_4, bbls delv .lb.	.09¼	.10½	.09¼	.10½	.09¼	.09½
98% Pb_3O_4, bbls delv .lb.	.09½	.10½	.09½	.10½	.09½	.10½
White, bbls, lcl ....lb.	.08¼	.08¾	...	.07½	...	.07½
Basic sulfate, bbls, lcl lb.	.07¼	.08	...	.07½	.06½	.07½
Lime, Chem., wks, bulk..ton	6.25	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ..ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls lb.	.08	.09¾	...	.08	.079	.08
Lithopone, ordi., (*PC*), bgs lb.	...	.04¼	...	.04¼	...	.04¼
Magnesium Carb, tech, wks lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, bbls, wks						
c-l ....ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, bbls.lb.	.14	nom.	.14	nom.	.13	.14
Dioxide, tech bgs, lcl ..ton	70.00	73.00	...	74.75	70.00	74.75
Sulfate, tech, 90-95%						
drms, ...ton l	.11¼	.11½	.11¼	.11½	.10½	.11½
Methanol, denat, drs,(*PC*) gal.	...	.66	...	.66	...	.66
Pure, nat, drs ....gal l	.55½	.75½	.55½	.61½	.55½	.61½
Synth, pure, drs ....gal. m	.34½	.40½	.34½	.40½	.34½	.40½
Methyl Acetate, tech tks..lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, 90 lb cyl ....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks. frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks ....gal.	...	.27	...	.27	...	.27
Naphthalene, crude, wks..lb.	2.75	3.00	2.75	3.00	2.50	3.00
Nickel Salt, bbls, NY.....lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ...lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls ......lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs ...lb.	...	.32	...	.32	...	.32
Orthodichlorobenzene, drms						
drs ....lb.	.06	.08½	.06	.08½	.06	.07½
Orthonitrochlorobenzene, wks						
.......................lb.	.15	.18	.15	.16	.15	.18
Orthonitrophenol, drs ....lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, wks ....lb.	...	.09	...	.09	...	.09
Para aldehyde, 99%, wks..lb.	...	.12	...	.12	...	.12
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ......lb.	...	.32	...	.32	...	.32
Dichlorobenzene, wks ...lb.	.11	.15	.11	.15	.11	.12
Formaldehyde, drs,						
wks (*FP*) ....lb.	.23	.24	.23	.24	.23	.24
Nitroaniline, wks ......lb.	...	.45	...	.45	...	.45
Nitrochlorobenzene, wks..lb.	...	.15	...	.15	...	.15
Nitrophenol, 185 lb bbls lb.	...	.35	...	.35	...	.35
Penetaerythritol, tech, del lb.	.33½	.35½	.33½	.35½	.33½	.35½
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks ....lb.	...	.48	...	.48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Lacquer diluents, tks,						
East Coast ....gal.	...	.11	...	.11	...	.11
Naphtha, V.M.P., East						
tks, wks ....gal.	...	.11	...	.11	.10½	.11
Petroleum thinner, 43-47,						
East, tks, wks ......gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Rubber Solvents, stand						
grd, East, tks, wks ..gal.	...	.11	...	.11	.10½	.11
Stoddard Solvents, East,						
tks, wks ....gal.	...	.09½	...	.09½	...	.09½
Phenol, 250-100 lb drs (A) lb.	.10½	.11¼	...	.12½	.12½	.13
Phthalic Anhydride, bbls						
wks (A) ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake .....lb.	.07	.07½	.09	.07½	...	.07
Potassium Bichromate						
csks *(*FP*) ....lb.	.09⅝	.10	...	.09⅝	...	.09⅝
Bisulfate, 100 lb kgs ..lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc lb.	.05½	.05¾	.05½	.05¾	.06½	.06¾
liquid, tks ....lb.	...	.0275	...	.0275	...	.0275
dms, wks ....lb.	.03	.03½	.03	.03⅛	.03	.03⅛
Chlorate crys, kgs.wks (A) lb.	.11	nom.	nom.	.11	nom.	.11
Chloride, crys, bgs, kgs lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks .....lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans ..lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, bgs, dom. blk unit	.53½	.56	.53½	.56	.56	.58
Permanganate, USP, crys,						
wks (*FP*) .... lb.	.21¾	.22¾	.19¾	.20¼	.19¾	.21
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	...	36.25

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ⅛c higher.

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Propane, group 3, tks (*PC*) lb.	.03	.03¾	.02¾	.03¾	.02¾	.03¾
Pyridine, ref., drms ...... lb.	...	.46	...	.46	...	.46
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech., drms .. lb.	.68	.74	.68	.74	.68	.74
Rochelle Salt, cryst ..... lb.	...	.43½	...	.43½	...	.43½
Salt Cake, 94-96%, wks .. ton	...	15.00	...	15.00	...	15.00
Saltpetre, grn, bbls ...... lb.	8.20	8.60	8.20	8.60	...	8.20
Shellac, Bone dry, bbls .. lb. r	.42½	.46	.42½	.46	.39	.42½
Silver Nitrate, vials ..... oz.	...	.32⅜	...	.32⅜	.26⅞	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks ..... 100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs ..... 100 lb.	1.05	1.13	1.05	1.13	1.05	1.13
Caustic, 76% grnd drms .... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms .. 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, sellers tks 100 lb.	...	2.00	...	2.00	...	2.00
Sodium Acetate, 60% tech, powd, flake, bbls, wks lb.	.05	.06	.05	.06	...	.05
Benzoate, USP bbls .... lb.	.46	.52	.46	.50	.46	.50
Bicarb, bbl, wks .... 100 lb.	1.85	2.76	1.85	2.76	1.70	1.85
Bichromate, cks, wks (*FP*) lb.	...	.07⅜	...	.07⅜	...	.07⅜
Bisulfite, 500 lb bbls, wks lb.	3.00	3.10	3.00	3.10	3.00	3.10
35-40% sol bbls, wks 100 lb.	1.40	1.65	1.35	1.80	1.35	1.80
Chlorate, bgs, wks (A) .. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks .. lb.	.14	.15	.14	.15	.14	.15
Fluoride, 90%, bbls, wks lb.	...	.08¼	...	.08¼	...	.08
Hyposulfite, bbls, wks 100 lb.	...	2.45	...	2.45	...	2.45
Metasilicate, wks 100 lb.	...	2.50	...	2.50	...	2.50
Nitrate, crude, bgs (A) ton	...	29.35	...	29.35	...	29.35
Nitrite, 500 lb bbls .... lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di- wks cryst .... 100 lb.	2.55	2.70	2.55	2.70	2.55	2.70
Tri-bgs, wks ..... 100 lb.	2.70	3.45	2.70	3.40	2.70	2.85
Prussiate, bbls, wks ... lb.	...	.11	...	.11	...	.11
Pyrophosphate, bgs wks c-l lb.	.0528	.0610	.053	.061	.053	.06
Silicate, 60°, drs, wks 100 lb.	...	1.70	...	1.70	...	1.70
40°, drs, wks .... 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY .. lb.	.05	.05½	.05	.05½	.09	.15
Sulfate, Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, 30%, bbls, wks lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, c-l, wks .. lb.	...	3.15	...	3.15	...	3.15
Sulfite, powd, bbls, wks lb.	...	.05¼	...	.05¼	...	.05¼
Starch, Pearl, bgs .... 100 lb.	...	3.10	...	3.10	...	3.10
Potato, bgs .... lb.	...	.0637	...	.0637	.061	.0637
Rice, 200 lb bbls ...... lb.	.09	.10	.09	.10	.09	.10
Sweet Potato, bbls .. 100 lb.	nom.	7.00	nom.	7.00	nom.	7.00
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs .. 100 lb.	1.90	2.40	1.65	1.95	1.65	1.95
Flowers, bgs ...... 100 lb.	3.30	4.15	3.30	4.15	3.05	3.35
Roll, bgs ...... 100 lb.	2.65	3.15	2.40	2.70	2.40	2.70
Sulfur Dioxide, cyl ...... lb.	.07	.08	.07	.08	.07	.09
tks, wks .... lb.	.04	.06	.04	.06	.04	.06
Sulfuryl Chloride ...... lb.	.15	.40	.15	.40	.15	.40
Talc, crude, c-l, NY .... ton	...	13.00	...	13.00	12.50	24.50
Ref'd, c-l, NY ...... ton	13.00	18.00	13.00	18.00	17.25	19.25
Tin, crystals, bbls, wks .. lb.	.39	.39½	.39	.39½	.39	.39½
Metal, NY (*PC*) (A) .. lb.	...	.52	...	.52	...	.52
Titanium Dioxide (*PC*) .. lb.	.14½	.14¾	.14½	.14¾	...	.14½
Toluol, drs, wks (*FP*) (A) gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ... gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd .... lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, ... lb.	(*FP*)	.08	(*FP*)	.08	...	.08
Tricresyl phosphate (*FP*) lb.	.24	.54½	.24	.54½	.25	.31
Triethylene glycol, dms lcl lb.	...	.26	...	.26	...	.26
Trimethyl Phosphate, drs lb.	.54	.56	.54	.56	.54	.56
Triphenyl Phos, drs (*FP*) lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .... lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs ..... lb.	.25	.26	.18	.20	.18	.20
Bees, bleached, cases .. lb.	.60	.63	.60	.63	.58	.61
Candelilla, bgs .... lb.	...	.38	...	.38	.33	.38
Carnauba, No. 1, yellow, bgs. .... lb.	...	.83¼	...	.83¼	.83¼	.89
Xylol, frt all'd, tks, wks .. gal.	...	.27	...	.27	...	.27
Zinc Chloride fused, wks .. lb.	.05	.0535	.05	.0535	...	.05
Metal, high grade slabs, c-l, NY (*FP*) (*PC*) 1000 lb.	...	8.66	...	8.66	...	8.65
Oxide, Amer, bgs, wks lb.	...	.07¼	...	.07¼	...	.07¼
Sulfate, crys, bbls, wks 100 lb.	3.60	4.60	3.60	4.60	3.60	3.65

Oils and Fats

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Babassu, tks, futures .... lb.	...	.111	...	.111	no prices	
Castor, No. 3, bbls ...... lb.	.13¾	.14¼	.13¾	.14¼	.12½	.13¾
China Wood, drs, spot NY lb.	...	.39	...	.39	.39	.40⅛
Coconut, edible, drs NY .. lb.	...	.0985	...	.0985	...	...
Cod Newfoundland, dms .. gal.	...	.90	...	.90	.85	.90
Corn, crude, tks, mills ... lb.	...	.12¾	.12¾	nom.	.12⅛	.12¾
Greases, Yellow .... lb.	...	.0929	...	.0929	...	.0929
Linseed, Raw, dms, c-l, spot lb.	.1520	.1540	.1520	.1540	.117	.143
Menhaden, tks, Baltimore gal.	...	.088	...	.089	.63¾	.666
Light pressed, drs ..... lb.	.117	.119	.117	.119	.11	.139
Oiticica, dms .... lb.	.23	.25	.23	.25	.29	.25
Oleo, No. 1, bbls, NY ... lb.	.13¾	nom.	nom.	.13¼	...	.13¼
Palm, Niger kernel, cks bulk .... lb.	...	.0825	...	.0825	.0925	...
Peanut, tks, f.o.b. mill .. lb.	...	.13	...	.13	.12⅞	.13
Perilla, dms, NY (A) .... lb.	...	.245	...	.246	...	.246
Rapeseed, blown, bbls, NY lb.	.18	.18½	.18	.18½	.18	.18½
Red, dms .... lb.	.13¼	.14¼	.13¼	.14¼	.11¾	.143
Soy Bean, crude, tks, mill lb.	...	.1175	.12¼	nom.	.12¼	nom.
Stearic Acid, double pressed dist bgs .... lb.	.14½	.15½	.14	.15¾	.14	.16½
Tallow City, extra loose .. lb.	...	.097¼	...	.097¼	...	.097¼
Turkey Red, single, drs .. lb.	...	.08¾	...	.08¾	...	.08¾

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"WE"-EDITORIALLY SPEAKING

The other night we attended a meeting of the New York Section of the American Institute of Chemical Engineers to hear an address by T. Spencer Shore, vice-president and treasurer of The General Tire & Rubber Co. and for seventeen months in Washington as Chairman of the Industry Advisory Committee of the War Production Board. His talk on "Industry, People and Government" is indicative of the thoughts of many of the younger executives and men in industry that we should realize more keenly the challenge to knuckle down and re-sell America on the enterprise or capitalistic system, which has brought to the United States the highest living standard the world has ever known.

Here are some excerpts from Mr. Shore's talk.

"How can the leaders of American industry be so smart in their relationships with their customers and yet be so dumb in their relations with people in Government? How can we in American industry be the smartest merchandisers—the best salesmen in the world—and yet not know how to merchandise successfully the greatest product known to mankind—The American Way of Life? Wouldn't you think that if we could sell new and unproved articles of all kinds and descriptions in any market, that we could sell a product that has been the envy of all of our competitors for 166 years? Can you imagine anything easier to sell than the American way of life? I can't! And I can't imagine anything easier to sell to the American people than the free enterprise system, providing we spend as much time and thought on selling it as we do on selling them a package of chewing gum.

"We know that the American way of life—the free enterprise system—is the greatest incentive to hard work, thrift, and efficiency. We know that no country has gone ahead, and that this country could not have gone ahead, as we have unless we had the free enterprise system. We know that Government-controlled or Government-operated business is less efficient than when a business is run for a profit.

"We know that with all of the misfortunes, with all of the inequities, with all of the unfortunate circumstances, we still have the greatest country in the world for the greatest majority of people, with the highest standard of living yet known to mankind. And we know that this was accomplished by American ingenuity, efficiency, and thrift—by an ambitious people with courage and the capacity for hard work under the free enterprise system.

"And, certainly, no one can tell us that the reason the United States with only 6% of the population of the world can and does produce 47% of all the goods manufactured in the world is because of our natural resources. For, if natural resources made a great industrial nation, then Russia, or possibly Brazil, would be the greatest industrial nation in the world.

"My first conclusion is that if the American way of life—the free enterprise system—is to survive, men in industry must realize that Government is going to play a more and more important role in our national economy.

"My second conclusion is that if the American way of life—the free enterprise system—is to survive, men in industry must understand Government and they must take an active interest in it.

"My third conclusion is that if the American way of life—the free enterprise system—is to survive, men in industry must realize that we are in a people's age, and property rights will be respected only if human rights are respected.

"My fourth conclusion is that if the American way of life—the free enterprise system—is to survive, the American people will have to want it badly enough to fight for it on the home front."

War makes a topsy-turvy world.. We aren't yet to the stage of having to take literally the old admonition about wooden nickels, but we may be on the way. Nickel-less nickels and copper-less coppers have arrived.

When nickel became scarce over a year ago, stainless steel was suggested as a replacement for the 75 per cent copper and 25 per cent nickel. Then, after Pearl Harbor, our imports of chrome for stainless steel were reduced. Next, silver and copper were tried, but this was no good because America is a slot-machine loving nation. When the coin was tested the silver and copper proved such good conductors of electricity that the principle of electrical resistance used in slot machines bounced the coins right out into the rejection slot. The new nickel-less nickel as finally issued contains 56 per cent copper, 35 per cent silver and 9 per cent manganese.

Steel pennies are also now coming out of the U. S. Government Mint in Philadelphia.

Here they come, bless 'em. Who? Why, the ladies, of course. Beginning March 1, the Civil Service Commission's Defense Training Institute in Brooklyn threw open its doors to women with college degrees who are interested in taking a 27-week tuition-free course in some of the elements of engineering. Graduates will be eligible for appointment as supplemental junior engineers under Federal Civil Service.

A WPB minor official who is too fresh from industry to be labeled bureaucrat stated recently that there are still some business men and industrialists who are not making much of an effort to find out how wartime control of materials works. Despite occasional temptation to toss this one back in reverse, the fact is that Washington is getting down to a system now as far as material and production controls are concerned. The least business men can do is to try to learn how the system is supposed to work and apply it. It isn't beyond comprehension.

Dr. C. M. A. Stine in a talk before a joint meeting of the Junior Chemical Engineers of New York, and the New York Section of A. I. Ch. E. recently added to our collection of definitions with the following:

"A consultant is a man who knows less about your business than you do and gets paid more for telling you how to run it than you could possibly make out of it even if you ran it right instead of the way he told you."

"Definition of a statistician: a man who draws a mathematically precise line from an unwarranted assumption to a foregone conclusion."

Fifteen Years Ago

Warner Chemical Co. and Westvaco Chlorine Products Corp. merge by an exchange of stock. New officials of the company are: William B. Thom, president; William D. Tatten, vice-president; John A. Chew, vice-president in charge of sales; and M. E. Gilbert, secretary-treasurer.

Hugh S. Taylor, head of chemistry department, Princeton University, awarded Nichols Medal at national gathering of chemists in New York.

Robert Neff, Boston Manufacturer of textile finishes and softeners, dies Feb. 4 at age of seventy.

Guido Meisel, American chemist, sentenced to one year imprisonment and a fine of 5,000 marks on charges of commercial espionage in seeking to obtain German chemical and dye secrets at Dusseldorf, Germany.

Wood Distillers Corp. organizes to act as selling agent for methanol and other products of associated producers.

Summary of War Regulations

There are no more important subjects to the chemical industry today than priorities, allocations, import and price controls. Chemical Industries, last month, chronologically digested the important regulations up to January 31, 1943. This month new regulations are brought up to March 11, 1943. Next month and each month thereafter additional and revised regulations will be given. Allocations of chemicals for March are given on Page 369, Part 1, this issue.

By way of explanation a "P" order identifies a limited blanket rating given to a company, or an industry to facilitate the acquisition of scarce materials needed by such companies for defense or essential civilian production.

Distribution of commodities under industry-wide control generally is governed by "M" (material) orders, regulating distribution and flow of a given material into defense or essential civilian production channels.

Limits on the production of materials are covered by "L" limitation orders.

Anhydrous Aluminum Chloride

Feb. 20, 1943. General Preference Order M-287 established allocation control of anhydrous aluminum chloride effective March 15, 1943. Exception is made for amounts of 50 pounds or less in the aggregate during any calendar month.

Antimony

March 8, 1943. An amended version of General Preference Order M-112 removes limitations on the use of antimony in automotive batteries and alloys and raises the limit on unallocated deliveries to any individual customer from a maximum of 25 pounds to a maximum total of 2,240 pounds, or one long ton, for each monthly period.

Previous prohibitions on the use of antimony in any form for the manufacture of white pigments, opacifiers, or frits for non-acid resisting ceramic enamels have been eliminated. However, restrictions on the antimony content of inorganic pigments, toys, decorative objects and ornaments remain unchanged.

Bismuth Chemicals

March 11, 1943. All bismuth chemicals are placed under allocation by General Preference Order M-295, effective April 1. Exempted are deliveries of less than 25 pounds per month of any single chemical, as well as chemicals packaged in containers of one pound or less for resale to retail druggists.

Cobalt

March 9, 1943. An amendment to Order M-39 removes cobalt from restricted use and places it under straight allocation, deliveries permitted on specific authorization of the Director General of Operations. Deliveries of less than 25 pounds of contained cobalt to any one person in any one month, or deliveries of any amount to subsidiaries of the Reconstruction Finance Corporation, may be made without authorization.

Copper Chemicals

March 5, 1943. An amendment to Preference Order M-227 covering copper sulfate, copper carbonate, copper oxide, copper nitrate, copper chloride and copper cyanide, in both cupric and cuprous forms, changes allocation of these materials from a monthly to quarterly basis. Deliveries during any quarter of not more than 1500 pounds of copper sulfate or not more than 300 pounds each of the other materials are exempt from the authorization requirement, as are also any deliveries of the materials that are to be used for soil treatment, in insecticides or fungicides, or in animal medicines.

Ethyl Alcohol

Feb. 27, 1943. Maximum Price Regulation No. 28 has been amended to expand the existing price schedule for ethyl alcohol to cover producers' sales of all formulas and pure and undenatured ethyl alcohol when sold in quantities of 50 gallons or more.

Fertilizers

March 10, 1943. Revised Maximum Price Regulation No. 108 (nitrogeneous fertilizer materials) allows manufacturers and dealers to establish maximum prices by adding a specified margin above their cost of materials.

Formaldehyde

Feb. 20, 1943. Effective March 1 this material was placed under allocation and Preference Order M-25 became Allocation Order M-25. After this date persons buying more than 555 pounds of formaldehyde must make application for allocation on Standard Chemical Form PD-600.

Lead Arsenate

Feb. 3, 1943. Maximum Price Regulation No. 315 establishes maximum prices for lead arsenate in quantities of 96 pounds or more delivered to the purchaser. Sales in quantities of less than 96 pounds may be made at the established maximum prices f.o.b. the manufacturer's warehouse or factory.

Feb. 23, 1943. Amendment 1 to Maximum Price Regulation No. 315 provides that manufacturers of lead arsenate are no longer required to attach to, or place within, each shipping case of the material a written statement when maximum prices have been changed from previous levels. The amendment provides that if a maximum price is changed, the manufacturer shall give each distributor or dealer to whom he sells a written statement showing the change. The statement has to be supplied at or before the time of first delivery to the distributor or dealer following the effective date of the change. The manufacturer must also notify each distributor that he is required in turn to supply a copy of the same written statement to each of his customers.

Non Metallic Minerals

Feb. 22, 1943. Maximum Price Regulation No. 327 established March 1942 prices as the ceiling for the following non-metallic minerals:

Agate	Illmenite
Andalusite	Industrial Diamonds
Aplite	Kaolin
Asbestos	Kieselguhr
Barite	Kyanite
Bentonite	Nepheline Syenite
Celestite	Olivine
Corundum	Pumice
Cryolite	Pumicite
Diatomaceous Earth	Quartz Pebbles
Dumortierite	Roofing Granules
Emery	Rutile
Feldspar	Sepiolite
Flint	Sillimanite
Fuller's Earth	Strontianite
Garnet	Topaz
Gilsonite	Tripoli
Graphite	Vermiculite
Greensand	Witherite
Iceland Spar	

Molybdenum

March 10, 1943. If the recovery of molybdenum from a chemical compound is commercially practicable, such a compound comes within the scope of Order M-110 (molybdenum), according to an official interpretation by the Director General of Operations.

War Regulations

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Nitrocellulose, Soluble

Feb. 3, 1943. Preference Order M-196 has been amended under Section 3013.1 forbidding the use of this product except as authorized by the Director General of Operations. The definition for soluble nitrocellulose is given as that having a nitrogen content of 12.5% or less made by nitrating any form of cellulose to the dehydrated, alcohol wet, xylol wet or water wet condition.

Paper and Paper Board

Feb. 23, 1943. Preference Order M-241 has been amended to permit the manufacture of grease proof and genuine vegetable parchment papers and glassine up to 100% of the amount manufactured during the operational base period. This amendment represents an increase of 15%.

Petroleum

Feb. 25, 1943. Under revised Price Schedule No. 88 petroleum products have been redefined to eliminate asphalt, as this material has been brought under a separate regulation No. 323.

Petroleum Products

March 3, 1943. Preference Rating Exclusion Order M-201 removes all preference ratings from a variety of petroleum products including liquefied propane, propylene, butanes, and butenes.

Potash

Feb. 27, 1943. General Preference Order M-291 places potash salts under allocation control on a basis of alternate 2 and 10 month periods beginning April 1, 1943. The order does not cover where deliveries during any period to one customer do not exceed one ton of potash (K_2O basis) for each month of that period.

Potash is defined in the order as covering potassium chloride, potassium sulfate, potassium magnesium sulfate and run of mine potash such as manure salts and kainit.

Shellac

Feb. 11, 1943. Following a meeting of the Technical Sub-Committee of The Printing Ink Industry Advisory Committee in Washington on February 11, the Chemical Division of WPB issued an announcement to the effect that it will attempt to make available at least a limited amount of shellac for use in the production of aniline inks when no satisfactory substitute for shellac can be found.

Silica Gel

Feb. 20, 1943. General Preference Order M-219 has been revoked by the Director General of Operations. The order, issued last October when there was a critical shortage, placed the entire silica gel supply under allocation control.

Silver

Feb. 25, 1943. Restriction on the use of domestic silver by non-essential industry to half the amount used in 1941 or 1942 is established by an amendment to Conservation Order M-199.

Steatite Talc

Feb. 6, 1943. Conservation Order M-239 has been amended to define a minimum practicable working inventory as meeting a six months' supply. Steatite talc is defined as meaning naturally occurring magnesium silicate, both crude and beneficiated, suitable for use in the manufacture of electrical insulators and containing not to exceed 1½% lime (CaO), not to exceed 1½% ferric oxide (Fe_2O_3), and not to exceed 4% alumina (Al_2O_3).

A Complete Check—List of Products, Chemicals, Process Industries

Petroleum*

Process of refining oil. No. 2,301,110. Benjamin Clayton to Refining, Inc.

Process of separating impurities from glycerine oil. No. 2,301,109. Benjamin Clayton to Refining, Inc.

Process of converting normally gaseous olefin hydrocarbons into distillate lubricating oil. No. 2,301,052. Emmet Kirn and Nathan Fragen to Standard Oil Co.

Process of converting petroleum naphthas of low knock rating to aromatic motor fuels of high knock rating. No. 2,301,044. Llewellyn Heard and Alex Oblad to Standard Oil Co.

Catalytic dehydrogenation process. No. 2,300,971. Robert Roberts and James Bergin to Shell Development Co.

Process of treating hydrocarbon fraction containing mercaptan sulfur and color- and gum-forming constituents to render it sweet to the doctor test and improve its color- and gum-stability. No. 2,300,877. Harry Drennan to Phillips Petroleum Co.

Process for producing normally liquid hydrocarbons boiling within the gasoline boiling range by condensing at least a portion of the constituents of a refinery C_4 cut with sulfuric acid. No. 2,300,818. William Sweeney and Kenneth Laughlin to Standard Oil Development Co.

Process for converting hydrocarbons of a C_4 cut to higher boiling products normally liquid in character. No. 2,300,817. William Sweeney and Kenneth Laughlin to Standard Oil Development Company.

Process for producing high anti-knock motor fuel. No. 2,300,691. Ernest Ocon.

Process for resolving petroleum emulsions of the water-in-oil type. No. 2,300,554. Melvin De Groote and Bernhard Keiser to Petrolite Corporation, Ltd.

Process for breaking petroleum emulsions. No. 2,300,555. Melvin De Groote and Bernhard Keiser to Petrolite Corporation, Ltd.

Dewaxing of white mineral oils. No. 2,300,420. John Hassler and Vito Lazzaro to West Virginia Pulp and Paper Company.

Addition agent for improvement of lubricating qualities of a hydrocarbon oil. No. 2,300,403. Gordon Byrkit to Continental Oil Co.

Method of increasing production of oil from wells in siliceous formations. No. 2,300,393. George Ayers, Jr. to The Pure Oil Company.

Process of dewaxing oils and deoiling the wax. No. 2,302,657. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corporation.

Separating waxy materials having different melting points. No. 2,302,434. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Process of separating waxes from oils. No. 2,302,433. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Apparatus for separating waxes from oils. No. 2,302,432. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Apparatus for separating waxes. No. 2,302,431. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Process of separating oil and waxes. No. 2,302,430. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Art of separating petroleum oils and waxes, the process which comprises dissolving the oil and wax in a solvent comprising more than 25 per cent isopropyl acetate and less than 75 per cent methylene dichloride. No. 2,302,429. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Apparatus for separating constituents of oils and waxes. No. 2,302,428. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Process of separating wax-containing materials. No. 2,302,427. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Process for deoiling wax. No. 2,302,386. Harmon Fisher to Union Oil Company of California.

Solvent extraction of normally liquid hydrocarbons. No. 2,302,383. Reginald Stratford and George Gurd to Standard Oil Development Co.

Process of stabilizing petroleum oil which has been sweetened with copper containing reagent. No. 2,302,352. Henry Schutze to Standard Oil Development Company.

Hydrocarbon conversion. No. 2,302,328. Louis Kelly to The M. W. Kellogg Company.

Method of refining and purifying mineral oil to separate the asphaltic and other undesirable bodies. No. 2,302,319. Robert Henry and James Montgomery to Phillips Petroleum Co.

Process for separation of petroleum oils into their aromatic constituents and paraffinic constituents. No. 2,302,303. Gordon Duncan to Standard Oil Development Company.

Cracking with synthetic gel catalysts. No. 2,302,297. Gerald Connolly to Standard Oil Development Co.

Petroleum oil containing a small proportion of organic nitriles. No. 2,302,281. Franklin Watkins to Sinclair Refining Company.

Means and method of testing oil. No. 2,302,224. Alexander Jones.

Catalytic conversion system. No. 2,302,209. Clifton Goddin, Jr. to Standard Oil Co.

Apparatus for continuously dewaxing oil and deoiling the wax. No. 2,302,195. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Process of removing desirable constituents from enriched absorption oil in the absence of steam or other stripping media. No. 2,302,187. Samuel Carney to Phillips Petroleum Co.

Process for separating wax from oil. No. 2,302,177. Ulric Bray and Claude Swift to Union Oil Company of Calif.

Recovering from petroleum cracking operation constituents thereof normally gaseous and suitable as motor fuel. No. 2,302,130. Thomas Leech to Petroleum Conversion Corp.

* Continued from last month (Vol. 543, Nos. 3, 4—Vol. 544, Nos. 1, 3).

Process for the manufacture of valuable products from olefins. No. 2,301,966. Richard Michel and Ludwig Muller.

Separating wax from chilled dewaxing solution containing dissolved oil and precipitated wax with portions of the dissolved oil trapped in the wax. No. 2,301,965. Oswald Mauro and Eddie Dons to Mid-Continent Petroleum Corp.

Mineral oil saturated with carotene. No. 2,301,941. William Frohring to S.M.A. Corporation.

Flushing Oil for cleaning metal bearings while moving parts are in motion and which is adapted to remove adherent gums, carbon, varnishes and fine metal particles. No. 2,301,918. John Morgan to Cities Service Oil Co.

Solid catalyst adapted for conversion of hydrocarbons at elevated temperatures. No. 2,301,913. Preston Veltman to The Texas Company.

Resins and Plastics

Process of increasing the resistance to heat, light and air, in rosin materials containing radicals of Steele's abietic acid. No. 2,299,577. Torsten Hasselstrom and Edward Brennan to G and A Laboratories, Inc.

Plastic composition, comprising sulfur dichlorhydrin plastic, and a gum. No. 2,299,509. Chester Snyder to Liatex Corp.

Urea-aldehyde resin composition. No. 2,300,208. Gaetano D'Alelio to General Electric Co.

Method of separating from asphaltic base crude a light-colored plastic material. No. 2,300,119. August Holmes to Standard Oil Development Co.

Modification of fatty oils for use as bases of coating materials and plastics. No. 2,300,090. Laszlo Auer.

Lead resinate of a polymerized rosin. No. 2,300,686. Paul Mosher to Hercules Powder Company.

Homogenous fused lead resinate of a hydrogenated rosin. No. 2,300,659. Herschel Elliott to Hercules Powder Co.

Resinous composition, the reaction product of bisthioammeline polyalkylene etherformaldehyde condensate and alkyd resin having free hydroxyl groups. No. 2,300,645. Herman Bruson and James Rainey to The Resinous Products & Chemical Co.

Ethyl cellulose molded article. No. 2,300,458. Arthur Mazzucchelli to Bakelite Corporation.

Plastic composition comprising chlorinated rubber and, as a plasticizer, a bis-aryloxyalkyl ether. No. 2,302,583. Richard Shutt to E. I. du Pont de Nemours & Company.

Manufacture of resins from naphthalene derivatives. No. 2,302,403. John Tetley to Sharples Chemicals, Inc.

Process of resinifying a polyhydric phenol. No. 2,302,363. August Bellefontaine.

Filler for vinyl resin plastics. No. 2,302,361. Victor Yngve to Carbide and Carbon Chemicals Corp.

Plastic acoustic pulp. No. 2,301,986. Mario Vladastri.

Rubber

Method of making closed cell expanded rubber by internally developed gases. No. 2,299,593. Dudley Roberts, Roger Bascom, and Lester Cooper to Rubatex Products, Inc.

Preservation of latex. No. 2,300,262. John McGavack to United States Rubber Co.

Process of purifying rubber latex. No. 2,300,261. John McGavack to United States Rubber Co.

Polymerizing tertiary base olefines by treating same with an active fluoride to produce rubberlike polymers. No. 22,210. Martin de Simo and Frederick Hilmer to Shell Development Co.

Accelerator of vulcanization and method of preparing it. No. 2,301,149. Winfield Scott to Wingfoot Corp.

Vulcanization of rubber. No. 2,301,117. Albert Hardman to Wingfoot Corporation.

Process of plasticizing synthetic rubber resulting from the emulsion polymerization of open chain diolefine. No. 2,300,607. Ewald Zaucker.

Process vulcanizing a rubber in the presence of magnesium oxide and an accelerator. No. 2,301,968. Warren Phillips to The B. F. Goodrich Co.

Textile

Flexible, odorless, heat- and age-resistant, varnished fabric material. No. 2,299,547. Henry Letteron to General Electric Co.

Process of conditioning yarn to render it more amenable to textile operations. No. 2,299,535. Joseph Dickey and James Normington to Eastman Kodak Co.

Stabilized dry rosin size. No. 2,299,312. Arthur Dreshfield to Hercules Powder Co.

Process for centrifugal forcing of treatment liquids through tapered, annular yarn cakes. No. 2,300,254. Leroy Jackson to E. I. du Pont de Nemours & Co.

Process of sizing synthetic linear polyamide yarn. No. 2,300,074. Daniel Strain to E. I. du Pont de Nemours & Co.

Process for obtaining textile materials characterized by softness and by non-creasing and non-crushing properties. No. 2,299,807. Charles Dunbar to Imperial Chemical Industries Limited.

Process for producing textile material of improved wearing quality. No. 2,299,786. Albert Battye, Joseph Tankard and Frederick Wood to Tootal Broadhurst Lee Co., Ltd.

Treatment of cellulose textile fibers in loose, uncarded and unspun, flock form for the purpose of impregnating and building up said fibers with added cellulose. No. 2,301,159. Fritz Drechsel.

Process of producing rayon fibers of improved tensile strength. No. 2,301,003. Walter Zetzsche and Erich Graumann to Walther H. Duisburg.

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U. S. Chemical Patents

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Process for increasing the affinity of cellulosic fibers. No. 2,300,589. Johannes Nelles and Otto Bayer to General Aniline & Film Corporation.
Process for improving light-fastness and strength of colored textile materials containing titanium dioxide. No. 2,300,470. Richard Sitzler to Celanese Corporation of America.
Production of thread from viscose. No. 2,302,589. Leslie Rose and John Wharton to Courtaulds Limited.
Process and apparatus for making artificial thread like products. No. 2,302,555. Hans Klammroth to North American Rayon Corp.
Alkaline-soluble, non-inflammable, nitrated, cellulose backing fabric for use in making lace and like articles. No. 2,302,107. Joseph Datlow.
Treatment of regenerated cellulosic yarns in the manufacture of tire fabrics. No. 2,302,082. William Whitehead to Celanese Corporation of America.
Artificial wool filament and yarn. No. 2,302,077. Henry Von Kohorn to Fibres Associates, Inc.

Agricultural Chemicals

Recovery of saponin from the juice of cactus plants. No. 2,301,787. Gustav Nord.
Wood preservative. No. 2,304,013. Frederick H. Norton to The Dow Chemical Co.
Preserving green foodstuffs and maintaining the color thereof. No. 2,305,643. Arthur Stevenson and Keith Swartz to Continental Can Co., Inc.
Plant treatment composition comprising synthetic auxin and organic insecticidal toxicant. No. 2,305,593. George Avery, Jr. to The Dow Chemical Co.
Reducing sugar product. No. 2,305,168. David Langlois to A. E. Staley Mfg. Co.
Apparatus for sacchrifying starchy materials. No. 2,304,679. Leo Christensen to National Agrol Co., Inc.
Casein manufacture. No. 2,304,429. John Spellacy to Hercules Powder Co.
Process for isolating vegetable proteins. No. 2,304,099. Percy Julian and Bernard Malter to The Glidden Co.
Fermented malt beverage. No. 2,306,717. Anton Dolenz to Dorothy K. Dolenz (½).
Producing potato starch conversion products. No. 2,307,725. Raymond Daly and James Walsh to American Maize-Products Co.
Liquefication of starch. No. 2,307,684. Hans Kauffmann, Paul Margulies and Joseph Ryan to Buffalo Electro-Chemical Co., Inc.
Process for bleaching flour. No. 2,307,631. Hugh McDonald to Pillsbury Flour Mills Co.
Producing corn syrup from degerminated corn. No. 2,307,491. Raymond Daly and James Walsh to American Maize-Products Co.
Sugar syrup composition. No. 2,307,062. Thomas Moutray to The Universal Royalty and Development Co.
Process for the production of non-caking fertilizer materials. No. 2,307,253. Jew Yee and Royall Davis.
Art of treating sucrose-bearing liquids. No. 2,307,326. Adolph Lissauer and Arthur Wright.

Cellulose

Process of making alpha cellulose from wood. No. 2,301,314. Ralph Montonna and Lew Cornell to Board of Regents of the University of Minnesota.
Manufacture of artificial filaments, foils, and other materials having a basis of organic derivatives of cellulose. No. 2,301,312. Robert Moncrieff and Harold Bates to Celanese Corporation of America.
Process of making predominantly plastic material and tough products thereof from lignocellulose. No. 2,303,345. William H. Mason and Robert M. Boehm to Masonite Corp.
Manufacture of cellulose derivatives. No. 2,302,752. Henry Dreyfus to Celanese Corporation of America.
Two-stage hydrolysis process for conversion of cellulose to a sugar. No. 2,305,833. Carl Warth.
Treating lignocellulose for producing product moldable under heat and pressure. No. 2,306,274. John Meiler.
Preparation of high viscosity mixed fatty acid esters of cellulose. No. 2,304,792. Loring Blanchard, Jr. to Eastman Kodak Co.
Organic solvent dry casting solution of cellulose ether containing, as a strip agent dilauryl phosphate. No. 2,306,963. Daniel D. Lanning to E. I. du Pont de Nemours & Co.
Ethyl hydroxy-alkyl ether of cellulose. No. 2,306,451. Leon Lilienfeld, Antonie Lilienfeld, Administratrix to Lilienfeld Patents Inc.

Ceramics

High silica glass. No. 2,303,756. Martin E. Nordberg and Harold E. Rumenapp to Corning Glass Works.
Manufacture of laminated glass. No. 2,305,827. Adolf Kampfer.
Prevention of ropiness in baked ware. No. 2,305,826. Anton Iglauer.
Opaquing agent for vitreous enamels. No. 2,306,357. Carl Harbert and Clarence Seabright to The Harshaw Chemical Co.
Opaquing agent for vitreous enamels. No. 2,306,356. Carl Harbert and Lester Bateman to The Harshaw Chemical Co.
Manufacturing a foam of glass. No. 2,306,330. Phillip Dewey to Pittsburgh Plate Glass Co.
Salt glazing ceramic ware. No. 2,305,908. Enos Steward.
Continuously producing flashed glass having very thin flashing layers. No. 2,305,683. Bernhard Engels.
Electrical insulating ceramic material made of magnesium titanate. No. 2,305,327. Hans Thurnaer to America Lava Corp.
Making white clouded enamel. No. 2,305,313. Ignaz Kreidl.
Ceramic pigment. No. 2,304,750. Charles Geary to E. I. du Pont de Nemours & Co.
Method of treating the rock, aplite, and of making ceramic ware. No. 2,304,440. Ralph Brenner and Roger Dubble to Dominion Minerals, Inc.
Glass solution and glass coating. No. 2,308,409. Robert N. Wenzel to Westinghouse Elec. & Mfg. Co.
Ceramic material for use as an insulator for spark plugs. No. 2,308,-115. Karl Schwartzwalder and Albra Fessler to General Motors Corp.
Ceramic composition and article. No. 2,308,092. Taine McDougal and Karl Schwartzwalder to General Motors Corp.

Chemical Specialty

Printing ink. No. 2,301,854. Everett Carman to Interchemical Corp.
Floor product consisting of abrasive grains bonded with sintered metal bond. No. 2,301,721. Edward Van der Pyl to Norton Co.
Clarification of an alcoholic beverage with acidified diatomaceous earth filter aids. No. 2,301,623. Milo Harrison to The Dicalite Co.
Insolubilizing water-soluble, hydroxyl-containing sizing material. No. 2,301,509. Louis Bock and Alva Houk to Rohm & Haas Co.
Composition for treating water to remove suspended matter. No. 2,301,429. Rowland Magill to Coal Processing Corp.
Splint-forming material comprising fibrous base impregnated with normally hard thermoplastic composition. No. 2,301,426. Stanley Lovell to Castex Laboratories, Inc.
Manufacturing non-acid refractory brick of increased intermediate temperature crushing strength. No. 2,301,402. Ressull Heuer to General Refractories Co.
Composition comprising tetraethyl lead and oil-dispersible surface-active compound. No. 2,301,370. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.
Chewing gum. No. 2,301,331. Jacob Schantz to Hercules Powder Co.
Composition of mattter for printing rolls containing a binder comprising protein and softener therefor, said softener comprising a keto-alcohol. No. 2,304,001. Joseph H. Kugler and William A. Vievering to Minnesota Mining and Mfg. Co.
Adhesive comprising an aqueous ureaformaldehyde resin adhesive with which is incorporated a comminuted cellulosic filler previously impregnated with benzyl alcohol. No. 2,303,982. Alfred Brookes to American Cyanamid Co.
Insecticidal composition comprising as an active toxicant stable sulfur-dithiocyanate. No. 2,303,981. Edgar C. Britton and Frank B. Smith to The Dow Chemical Co.
Personal cleaning composition. No. 2,303,932. Bruno T. Guild.
Cutting Oil. No. 2,303,853. William A. Lutz and Edward R. Butcher to Gulf Research & Development Co.
Paper envelope adhesive. No. 2,303,791. Paul B. Davidson and Julius R. Adams to Old Colony Envelope Co.
Insecticidal composition. No. 2,303,683. Gerald H. Coleman and Fred W. Fletcher to The Dow Chemical Co.
Dental impression material. No. 2,303,600. Constant A. Benoit and Herman C. Fuchs to Permatex Co., Inc.
Solvent for dewaxing. No. 2,303,570. James V. Montgomery, Luke B. Goodson and Robert W. Henry to Phillips Petroleum Co.
Anhydrous lime soap lubricant free from glycerine comprising mineral lubricating oil, calcium fatty acid soap, and a stabilizing mixture. No. 2,303,558. Gus Kaufman and Robert S. Barnett to The Texas Co.
Solvent Composition. No. 2,303,551. Augustus S. Houghton to Allied Chemical & Dye Corp.
Dewaxing solvent for mineral oils. No. 2,303.543. Luje B. Goodson, James V. Montgomery and Robert W. Henry to Phillips Petroleum Co.
Shortening comprising hydrogenated cottonseed oil and a small but effective amount of a partial ester of mannitan and a fatty acid obtainable by hydrolysis of hydrogenated cottonseed oil. No. 2,303,432. Kenneth R. Brown to Atlas Powder Co.
Alkaline detergent. No. 2,303,397-400. Charles Schwartz to Hall Labs. Inc.
Grease and process of making same. No. 2,303,256. James Camelford to Alox Corp.
Stable emulsion including water, an oleaginous material and precipitated hydrated magnesium trisilicate as an emulsifying agent. No. 2,303,236. Robert Shelton and Clement Huyck to The Wm. S. Merrell Co.
Soap Composition. No. 2,303,212. Mearl A. Kise and James Vitcha to The Solvay Process Co.
Soluble oil in form of a clear, homogeneous, stable liquid consisting of a major proportion of kerosene, a minor proportion of water, an alkali metal resinate and free oleic acid. No. 2,303,136. Clement Perkins.
Lubricant and preparation thereof. No. 2,303,068. George Schoenbaum to Jasco, Inc.
Composition for mothproofing. No. 2,302,805. Heribert Schussler to General Aniline & Film Corp.
Surface modifying composition. No. 2,302,697. Morris Katzman to The Emulsol Corp.
Acid resistant laminated floor covering. No. 2,305,804. Eugen Bentz, Hans Bruck, Fritz Heinrich and Johannes Jaenicke, Hermann Miedel, Herbert Knoop, and Otto Schweitzer.
Lubricating oil composition. No. 2,306,354. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.
Refractory material. No. 2,306,349. Eugene Wainer to The Titanium Alloy Mfg. Co.
Pinacolas as insecticides. No. 2,306,338. William Hester to Rohm & Haas Co.
Sheet material for wrapping wax candles. No. 2,306,278. Frank Reichel and Ralph Cornwell to Sylvania Industrial Corp.
Method of rendering materials water repellent. No. 2,306,222. Winton Patnode to General Electric Co.
Spirit varnish solvent and thinner. No. 2,306,114. Franklin Bent and William Ponig to Shell Development Co.
Wetting and penetrating compounds, alkylol amide of poly-carboxylic acid alkyl ester. No. 2,306,095. Swanee Valjavee to Morton Chemical Co.
Edible product having dust of non-hygroscopic pulverulent mannitol crystals on its exterior surface. No. 2,305,960. James Frorer to Atlas Powder Co.
Preparing bottom filler material for shoes. No. 2,305,741. Anthony Siers to O'Donnell Shoe Co.

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Lubricating oil. No. 2,305.627. Bert Lincoln and Gordon Byrkit to The Lubri-Zol Development Corp.
Imparting flavor and aroma to a food product at the time of use. No. 2,305,622. Roland Kremers to General Foods Corp.
Imparting flavor and aroma to a food product at the time of use. No. 2,305,621. Roland Kremers to General Foods Corp.
Imparting flavor to a food product by adding a stable non-volatile, non-oxidizable functional derivative of a flavor or aroma bearing constituent of a volatile oil. No. 2,305,620. Roland Kremers to General Foods Corp.
Unsaturated keto esters as insecticides. No. 2,305,558. Richard Roblin, Jr. and William Moore to American Cyanamid Co.
Disinfectant. No. 2,305,546. Vartkes Migrdichian to American Cyanamid Co.
Organic mercury compounds as disinfectants for organic materials. No. 2,305,545. Vartkes Migrdichian to American Cyanamid Co.
Conductive shoe including a sole portion containing chlorides. No. 2,305,542. Chaytor Mason to O'Donnell Shoe Co.
Lacquer solvent and composition. No. 2,305,511. Franklin Bent and Frederick Hilmer to Shell Development Co.
Process of consolidating or waterproofing mortar. No. 2,305,483. Carl Letters.
Hair shaping composition. No. 2,305,356. William Luckenbach to Rohm & Haas Co.
Method of preserving eggs with alkali-metal metaphosphate. No. 2,305,263. Golden Latshaw.
Producing vulcanized oil composition. No. 2,305,164. Bruce Hubbard to Ideal Roller & Mfg. Co.
Waterproofing composition for concrete or mortar. No. 2,305,113. Edward Scripture, Jr. to The Master Builders Co.
Soap antioxidant. No. 2,305,043. William ter Horst to United States Rubber Co.
Germicide comprising formaldehyde, an aliphatic alcohol, and a compound containing a reducing anion. No. 2,304,950. Morgan Parker and Thomas Frost to Bard-Parker Co., Inc.
Lubricant. No. 2,304,874. Edward Barnard to Standard Oil Co.
Composition for foundry molds and cores comprising 100 parts of a granular refractory zirconium compound and 1 to 50 parts of granular carbon. No. 2,304,751. Donald Hake and Wilbur Wellings to The Titanium Alloy Mfg. Co.
Parasiticidal compositions containing sulfur and method for the preparation thereof. No. 2,304,749. Roy Cross, Matthew Cross and Walter Cross, Jr. to Kansas City Testing Lab.
Parasiticidal material. No. 2,304,722. Eugene Witman to The Sherwin-Williams Co.
Dental alloy. No. 2,304,416. Josef Leuser to Chemical Marketing Co., Inc.
Hydraulic cement comprising the heat reaction product of beryllium oxide and calcium oxide, said product being capable when finely divided and mixed with water of setting to a hard mass. No. 2,304,391. Oswald Zimmerman to Kerr Dental Mfg. Co.
Composition for treating metal surfaces preparatory to painting. No. 2,304,299. Clete Boyle and Martin Sclar.
Process of insolubilizing hydroxyl-containing sizes. No. 2,304,252. Onslow Hager and Louis Bock and Alva Houk to Rohm & Haas Co.
Method of carroting fur and composition for use therein. No. 2,306,872. Constantine F. Fabian to The Non-Mercuric Carrot Co.
Wax-lined container. No. 2,306,576. Albin H. Warth and William C. Rainer to Crown Cork and Seal Co.
Reusable adhesive tape. No. 2,306,487. James A. Mitchell to E. I. du Pont de Nemours & Co.
Moistureproof sheet wrapping material. No. 2,306,478. Harold S. Holt to E. I. du Pont de Nemours & Co.
Dispensing insecticide in aerosol form to increase its effective concentration. No. 2,306,434. Lyle D. Goodhue and William N. Sullivan to Claude R. Wickard, Sec. of Agric. of U. S.
Chewing gum. No. 2,306,415. Charles C. Walker to John W. Glenn.
Heat sealing filter sheet material. No. 2,306,400. Theodore F. Menzel to Millie Patent Holding Co., Inc.
Alpha-N-amyl cinnamal ethyl cyanoacetate as pest-control agent. No. 2,307,705. William Moore to American Cyanamid Co.
Benzal octyl cyanoacetate as pest-control agent. No. 2,307,704. William Moore to American Cyanamid Co.
Benzal ethyl cyanoacetate as pest control agent. No. 2,307,703. William Moore to American Cyanamid Co.
Alpha-1-naphthyl cinnamic nitrile as pest-control agent. No. 2,307,702. William Moore to American Cyanamid Co.
Cyclo-hexylidene ethyl cyanoacetate as insecticide. No. 2,307,701. William Moore to American Cyanamid Co.
Alpha-phenyl cinnamic nitrile as insecticide. No. 2,307,700. William Moore to American Cyanamid Co.
Insecticide comprising disophorone. No. 2,307,482. Seaver Ballard and Vernon Haury to Shell Development Co.
Blood albumin-blue-hexamethylenetetramine adhesive containing about 23% to 35% of glycerine on a dry basis. No. 2,307,198. Edwin Colt and Earl Cornwell to Armour and Co.
Coated abrasive. No. 2,307,232. Nicholas Oglesby to Behr-Manning Corp.
Antifreezing medium comprising water, formamide, and formaldehyde. No. 2,308,246. Herbert Polin and Albert Nerken to H. S. Polin Laboratories, Inc.
Production of synthetic drying oils. No. 2,308,222. William Walton and Wesley Jordan to The Sherwin-Williams Co.
Anti-rusting oil for inhibiting corrosion of metals. No. 2,308,282. Louis H. Howland and Wm. P. ter Horst to U. S. Rubber Co.
Cutting oil composition. No. 2,308,427. Theodore G. Roehner and Louis H. Sudholz to Socony-Vacuum Oil Co.
Electric welding including blanketing welding zone with prefused composition comprising manganese oxide alumina, and silica. No. 2,308,194. Wilber Miller to The Linde Air Products Co.
Iceproof glue. No. 2,308,185. Wesley Lindsay and Harold Lietz to The Arabol Mfg. Co.

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Preparing roofing and siding material. No. 2,308,173. Norman Harshberger to Carbide and Carbon Chemicals Corp.
Drying oil. No. 2,308,020. Richard Morse to Distillation Products, Inc.
Compressed composition comprising at least 30% cork bark dust, at least 10% fiber, and at least 20% binder. No. 2,307,860. Charles Schuh to Carbide and Carbon Chemicals Corp.
Metallic soap composition. No. 2,307,852. Joseph Nothum and Francis Licata to National Oil Products Co.
Mothproofing composition containing as an essential active ingredient a tertiary amine. No. 2,307,775. Albert Flenner and Avery Goddin to E. I. du Pont de Nemours & Co.
Pour point depressant for lubricating oils. No. 2,308,116. Isador Silverman to L. Sonneborn Sons, Inc.

Coal Tar Chemicals

Manufacture of nitrogenous naphthalene derivatives. No. 2,301,286. Walter Kern, Paul Sutter and Richard Tobler to Society of Chemical Industry in Basle.
Purification of acetylene prepared by thermal or electrical methods. No. 2,301,240. Paul Baumann, Heinrich Schilling and Friedrich Zobel to Jasco, Inc.
Pyridine dicarboxylic acids. No. 2,302,903. Kurt Westphal and Hans Andersag to Winthrop Chemical Co., Inc.
Process for producing improved asphalts. No. 2,303,023. Harry Cier to Standard Oil Development Co.
Process for the production of isobutylene and its dimer. No. 2,303,-362. Alfred C. Jessup to Charles Weizmann.
Halogenated derivatives of aceto propane. No. 2,302,671. Edwin R. Buchman to Research Corp.
Method for the determination of the content of isobutane in a mixture comprising essentially isobutane and n-butane. No. 2,303,265. Alfred Francis to Socony-Vacuum Oil Co., Inc.
Mixed esters of methylol phenols. No. 2,306,932. Herman A. Bruson to The Resinous Products & Chemical Co.
Agglomerating flocculent carbon black. No. 2,306,698. George L. Heller and Carl W. Snow.
Process for the preparation of active carbon black. No. 2,307,050. Harry Kleopfer to Chemical Marketing Co., Inc.
Process for hydrogenating distillation extraction products from coals. No. 2,308,247. Alfred Pott and Hans Broche.
Producing a Mexican type paving asphalt. No. 2,308,245. Roman Ortynsky to Shell Development Co.

Coatings

Enamel-coating ferrous metals. No. 2,301,741. William Morris to Poor & Co.
Method of coating phenol reactors and the like. No. 2,303,658. Frank Porter to the Solvay Process Co.
Metal coating. No. 2,303,350. William A. Fuller.
Metal coating. No. 2,303,242. Robert Tanner and Robert Harris to Parker Rust Proof Co.
Process producing bright, tin-containing coatings on a higher melting base metal. No. 2,302,035. Colin Frank to Crucible Steel Co. of America.
Catalytic conversion of carbonaceous materials. No. 2,305,538. George Liedholm, Robert Cole and Irving Shuls to Shell Development Co.
Hard unoxidized bituminous material for use in a storage battery company. No. 2,305,440. Henry Noel to Standard Oil Development Co.
Heat-stable bituminous product. No. 2,304,773. Benjamin Anderton to Allied Chemical & Dye Corp.
Preparation of alpha-chlormethyl naphthalene. No. 2,304,537. Adrien Cambron to The Honorary Advisory Council for Scientific and Industrial Research.
Method of manufacturing primary carbon. No. 2,304,351. Worth Goss and Oliver Goss to William A. Carlisle, Sr.
Method of producing a machined carbon article which comprises impregnating with naphthalene a carbon article to be machined, machining the impregnated article, and then volatilizing and removing the naphthalene. No. 2,304,166. Marcus Hatfield to National Carbon Co., Inc.
Coating composition adapted to be applied to a transparent base and drying to transparent permanently haze-free film. No. 2,305,497. Alfred Rummelsburg to Hercules Powder Co.
Metallic receptacle coating. No. 2,305,224. Donald Patterson to American Cyanamid Co.
Process of curing surface covering materials. No. 2,305,217. Walter Durant to American Cyanamid Co.
Curing siccative surface covering materials. No. 2,305,216. Walter Durant to American Cyanamid Co.
Preparing multitone coated articles. No. 2,306,525. John S. Cummings to Interchemical Corp.
Cataphoretic deposition of insulating coatings. No. 2,307,018. James Cardell to Raytheon Production Corp.
Method of coating cellulose derivative sheeting. No. 2,308,024. Maurice Piker to Eastman Kodak Co.

Dyes, Stains

Wood stain solvent. No. 2,302,760. Henry Goodman, Jr. to Carbide and Carbon Chemicals Corp.
Stain of the water type comprising water, coloring material and a binder consisting of a boric acid-polyhydric alcohol resin which is water soluble and which retains its resinous character on drying out of water solution. No. 2,302,837. Edmond Bucy to Atlas Powder Co.
Metalizable azo dyestuffs. No. 2,301,333. Max Schmid to Society of Chemical Industry in Basle.
Dyestuffs of the anthraquinone series. No. 2,302,823. Myron Whelen to E. I. du Pont de Nemours & Co.
Printing of ester salts of leuco vat dyestuffs. No. 2,302,753. Jacques Duport to Durand & Huguenin S. A.
Manufacture of complex chromium compounds of ortho-hydroxyazo dyestuffs which contain sulfonic acid groups. No. 2,305,747. Fritz Straub and Emil Mannhart to Society of Chemical Industry in Basle.
Water-soluble, stable dyestuff preparations. No. 2,305,691. Paul Grossmann to Sociey of Chemical Industry in Basle.
Metallized azo dyes. No. 2,305,095. Neil Mackenzie to American Cyanamid Co.
Dyeing with vat dyestuffs. No. 2,304,502. William Hopkins, Simon McQueen, and Clarence Woolvin to Imperial Chemical Industries Ltd.
Sensitizing dyes containing thienylthiazole radicals and intermediates therefor. No. 2,304,112. Edmund Middleton to E. I. du Pont de Nemours & Co.
Dyeing vinyl polymers. No. 2,306,880. Karl Heymann to American Viscose Corp.
Water-insoluble azo dyestuffs. No. 2,306,681. Werner Zerweck, Josef Riedmair and Walter Brunner to General Aniline & Film Corp.
Process of producing aza-methine dyes. No. 2,307,049. John Kendall to Ilford Limited.
Dye bath for the dyeing of textile goods. No. 2,308,021. Ferdinand Munz to General Aniline & Film Corp.
Process for improving fastness to wet treatment of dyeings with wool dyestuffs on animalized cellulosic material. No. 2,307,973. Wilhelm Tischbein and Otto Bayer, Johannes Nelles and Fritz Ruf to General Aniline & Film Corp.
Azo dyes. No. 2,307,921. Joseph Dickey and James McNally to Eastman Kodak Co.

Equipment

Telemetric control system. No. 2,301,897. John Luhrs to Bailey Meter Co.
Double distilling apparatus and process. No. 2,301,835. Abraham White, and Thurston Hartwell to Barnstead Still & Sterilizer Co., Inc.
Chemical gun-trap to destroy predatory animals. No. 2,301,764. Charles L. Wainwright.
Apparatus for the partial polymerization of mobile monomeric liquid to the condition of a viscous syrup. No. 2,301,204. Charles Fields and Reuben Fields to E. I. du Pont de Nemours & Co.
Apparatus for maintaining particles in suspension in a suspensoid. No. 2,301,203. Foster Doane to Magnaflux Corp.
Evaporator. No. 2,302,993. Harold Graham to The Lummus Co.
Titration apparatus. No. 2,305,892. Alexander Newman to Precision Scientific Co.
Vessel for treating metals, ores and earths in chemical and metallurgical industry adapted to be moved in all directions. No. 2,305,823. Johannes Wotschke.
Aerating device for mixing gases with liquids in fermentation vessels. No. 2,305,796. Max Seidel.
Electron-optical lens. No. 2,305,761. Bodo Borries and Ernst Ruska.
Electronic microscope. No. 2,305,459. Hans Schuchmann and Bodo von Borries, and Hulmut Ruska.
Electronic microscope. No. 2,305,458. Ernst Ruska, Emil Hentschel, and Kreis Osthavelland, and Hans Schuchmann.
Acetylene generator. No. 2,305,203. Elmer Smith to Smith Welding Equipment Corp.
Chlorinating device for introducing chlorine into a water supply line. No. 2,305,108. Marion Rowe to Joseph Reynolds.
Apparatus for measuring liquid in a gas-liquid mixture flowing through portion of a line. No. 2,304,875. Leroy Barnhart to Stanolind Oil and Gas Co.
Apparatus for electrically measuring salinity. No. 2,306,691. Grenville B. Ellis to Control Instrument Co., Inc.
Apparatus for determining rate of gas formation in hydrocarbon conversion. No. 2,306,606. Joel H. Hirsch to De Florez Engineering Co., Inc.
Gas and liquid mixing apparatus. No. 2,306,601. Bertie S. Harrington.
Gasoline knock recorder. No. 2,306,372. George B. Banks.
Apparatus for separating liquids of different specific gravities. No. 2,307,498. Wells Fleming to Ruth Newman and Mildred Hirshstein.
Purification device for liquids. No. 2,308,230. Raphael Poracchia.
Apparatus for synthesis of anhydrous ammonium chloride from the anhydrous reagents, ammonia and hydrogen chloride. No. 2,308,-293. Aylmer H. Maude.
Construction of molecular models. No. 2,308,402. Hugh S. Taylor to Research Corp.
Hydrogen analyzer. No. 2,307,800. Francis Norton to General Electric Co.

Explosives

Manufacture of trinitroresorcin. No. 2,301,912. Delbert Jones and Carl Roberts to Western Cartridge Co.
Colloided nitrocellulose propellent powder gun charge comprising an antimonyl compound free from halogens and containing a combined alkali metal. No. 2,304,037. Thomas Thomson and Edward Whitworth to Imperial Chemical Industries Ltd.

Fine Chemicals

Manufacture of 2-alkyl-3-phytyl-1, 4-naphthoquinones. No. 2,301,890. John Lee.
Local-anesthetic salt of an aliphatic sulfonic acid. No. 2,301,796. Horace Shonle to Eli Lilly and Co.
Biological product of protein class consisting of casein and egg white and diazotized amino-substituted carboxylic acid amide of histamine. No. 2,301,532. Norbert Fell to Parke, Davis, & Co.
Forming a plurality of images from master negative plate by opaquing. No. 2,301,488. Leslie Whittenberg to Eastman Kodak Co.
Reducing aerial oxidation of color-forming photographic developers. No. 2,301,387. Ralph Evans and Wesley Hanson, Jr. to Eastman Kodak Co.
1, 4-Naphthoquinone compounds. No. 2,301,382. Joseph Dickey and James McNally to Eastman Kodak Co.

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Preparing polymethine compound. No. 2,301,361. Leslie Brooker and Frank White to Eastman Kodak Co.
Tri-p-anisyl-alkyl-ethylenes, medicinal compounds. No. 2,301,260. John Davies and Leslie Elson to Imperial Chemical Industries Ltd.
Fluorescent-phosphorescent screen comprising a sheet of supporting material and a layer of material thereon comprising barium fluorochloride, as its predominant luminescent ingredient. No. 2,303,917. Herbert J. Dietz to Eastman Kodak Co.
Process of purifying 1-nitroanthraquinone. No. 2,302,729. Myron Whelen to E. I. du Pont de Nemours & Co.
p-Sulfonamide-benzene-azo-naphthylamine sulfonic acids. No. 2,302,955. George Raiziss, Le Roy Clemence and John Moetsch to Abbott Laboratories.
Sulfonic acid esters of ketols of the cyclopentanapolyhydrophenanthrene series and process of making same. No. 2,303,498. Tadeus Reichstein to Roche-Organon Inc.
Derivatives of P-aminobenzenesulfonylamide (i. e., Sulfanilamide). No. 2,303,698. Morris S. Kharasch and Otto Reinmuth to Eli Lilly and Co.
Manufacture of derivatives of phenanthridine. No. 2,303,517. Leslie Percy Walls and Gilbert T. Morgan by Frank H. Bell executor.
Recovery of water soluble vitamins from fish livers. No. 2,302,928. Clarence Whitmoyer and William Moore to Whitmoyer Laboratories, Inc.
Process for preparation of substances having antirachitic properties. No. 2,302,828. Lester Yoder to Iowa State College Research Foundation.
Fluorescent screen comprising a mixture of blue cathodo-luminescent calcium sulfide and yellow cathodo-luminescent zinc beryllium silicate. No. 2,302,770. Stanley Henderson and Ernest Fogg to Electric & Musical Industries Ltd.
Manufacture of concentrated solutions of organic medicinal substances not easily soluble in water using ethylurethane as solvent. No. 2,305,832. Werner Ursum.
Process of making dialkyl stiboestrols. No. 2,305,748. Laszlo Vargha.
Manufacture of compounds of cyclopentanopolyhydrophenanthrene series. No. 2,305,727. Karl Miescher and Caesar Scholz to Ciba Pharmaceutical Products, Inc.
Production of anthraquinone derivatives. No. 2,305,690. Paul Grossmann to Society of Chemical Industry in Basle.
Unsaturated compound of cyclopentanopolyhydrophenanthrene series. No. 2,305,602. Adolf Butenandt to Schering Corp.
Preparation of cardioactive drugs. No. 2,305,570. Herman Dorn to Parker-Dorn, Inc.
Process for preparation of alpha-hydroxy-beta, beta-dimethyl-gamma-hydroxy butyric acid or gamma-lactone. No. 2,305,466. Herbert Carter to Abbott Laboratories.
Photographic material comprising a support and one silver halide emulsion layer containing silver chloride, said layer containing a polymethine dyestuff. No. 2,304,981. Gustav Wilmanns to General Aniline & Film Corp.
Triarylmethane compound. No. 2,304,946. James McNally, Joseph Dickey and James Van Allan to Eastman Kodak Co.
Producing a color-forming photographic layer. No. 2,304,940. Leopold Manners and Leopold Godowsky, Jr. to Eastman Kodak Co.
Multilayer photographic material containing color formers. No. 2,304,939. Leopold Mannes and Leopold Godowsky, Jr. to Eastman Kodak Co.
Triarylmethane compound. No. 2,304,890. Joseph Dickey and James McNally to Eastman Kodak Co.
Anthraquinone compound. No. 2,304,889. Joseph Dickey and James McNally to Eastman Kodak Co.
Color photography. No. 2,304,884. Burt Carroll to Eastman Kodak Co.
Preparation of hydroxy pregnane derivatives. No. 2,304,837. Russell Marker to Parke, Davis & Co.
Acyl chlorides and ketones derived therefrom in the cyclopentanophenanthrene series and method of preparing same. No. 2,304,101. Percy Julian and John Cole to The Glidden Co.
Preparation of tertiary carbinols of the cyclopentanophenanthrene series. No. 2,304,100. Percy Julian and John Cole and Peter Carr to The Glidden Co.
Photographic developer comprising aliphatic amino compound. No. 2,306,903. William H. Wood to Harris-Seybold-Potter Co.
Preparation of steroidal carbinols. No. 2,306,635. Russell E. Marker to Parke Davis & Co.
Manufacture of ketols of cyclopentanopolyhydrophenanthrene series and derivatives. No. 2,306,552. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Products, Inc.
Color development in photography. No. 2,306,410. Karl Schinzel to Eastman Kodak Co.
Antihemorrhagic compound. No. 2,307,084. Max Tishler and Norman Wendler to Merck & Co., Inc.
Process for the production of colored photographic images with dye-stuff formers fast to diffusion. No. 2,307,399. Alfred Frohlich and Wilhelm Schneider to General Aniline & Film Corp.
Manufacture of highly active substances from the posterior lobe of the hypothysis. No. 2,308,287. Karl Junkmann to Schering Corp.
Developer for diazo prints. No. 2,308,058. Clyde Crowley and John Mullen to The Huey Co.
Colored photographic image. No. 2,308,023. Willard Peterson to Eastman Kodak Co.
Unsymmetrical thiazolinocarbocyanine dye and photographic emulsion. No. 2,307,916. Leslie Brooker to Eastman Kodak Co.
Anthraquinone compound. No. 2,370,782. James McNally and Joseph Dickey and Arzy Gray to Eastman Kodak Co.

Industrial Chemicals

Process of increasing the bulk density of water-insoluble solid cellulose fatty acid ester. No. 2,301,904. Bayard Lamborn to Hercules Powder Co.
Composition of polyvinyl halide and liquid ester of 4-cyclohexene-1, 2-dicarboxylic acid. No. 2,301,867. Thomas Gresham to The B. F. Goodrich Co.
Di-(o-hydroxy aromatic ketone) aliphatic polyamine compound of the Schiff's base type free of strongly acidic groups. No. 2,301,861. Frederick Downing and Charles Pedersen to E. I. du Pont de Nemours & Co.
Manufacture of lower aliphatic esters of pantothenic acid. No. 2,301,829. Andre Studer.
Process of making higher aliphatic lactones. No. 2,301,827. Max Stoll to Firmenich & Cie.
Method for producing and using nonoxidizing gases. No. 2,301,812. Mahlon Restschler, Willoughby and Benjamin Test to William Wesseler, and to William Hunsdorf.
Manufacture of 2-keto-levo-gulonic acid. No. 2,301,811. Tadeus Reichstein to Hoffmann-La Roche Inc.
Recovering hydrogen chloride and sulfur dioxide from gas mixtures. No. 2,301,779. Paul Herold and Georg Markus.
Producing copper salts of polybasic organic acids. No. 2,301,762. Sidney Tuwiner and Dwight Dodge to Phelps Dodge Corp.
Process of making powder metal bearing. No. 2,301,756. Richard Shutt to Battelle Memorial Institute.
Fluorescent material of devitrefied glass ZnO, SiO_2. No. 2,301,690. Bennett Ellefson to Sylvania Electric Products Inc.
Recovery and detoxication of illuminating gas containing carbon monoxide and hydrogen. No. 2,301,687. Oskar Dorschner to American Lurgi Corp.
Process for freeing water from salts. No. 2,301,669. Adolf Richter.
Making molded articles from alkali metal cyanide. No. 2,301,666. Konrad Gabel.
Production of pure sulfur dioxide. No. 2,301,650. Nicolay Titlestad to Chemical Construction Corp.
Manufacture of melamine. No. 2,301,629. Victor King to American Cyanamid Co.
Capillary-active sulfonated isophorones. No. 2,301,561. Clinton MacMullen and Herman Bruson to Rohm & Haas Co.
9-fluorene beta butyronitrile and method for its preparation. No. 2,301,518. Herman Bruson to The Resinous Products & Chemical Co.
Cyano-isopropyl ethers of cyanoalcohols. No. 2,301,517. Herman Bruson to The Resinous Products & Chemical Co.
Method of making acetyl-cycloalkenes. No. 2,301,515. Edgar Britton, Howard Nutting, and Lee Horsley to The Dow Chemical Co.
Evaporating metallic fluorides in a vacuum. No. 2,301,456. George Sabine to Eastman Kodak Co.
Amino derivatives. No. 2,301,381. Joseph Dickey and James McNally to Eastman Kodak Co.
Copolymers of cyclic imides of dicarboxylic acids. No. 2,301,356. Harold Arnold and Merlin Brubaker and George Dorough to E. I. du Pont de Nemours & Co.
Organic material consisting of rosin derivatives and an anti-oxidant. No. 2,301,329. Lyle Rothenberger to Hercules Powder Co.
Autodispersible rosin composition capable of forming emulsion of oil-in-water type. No. 2,301,298. Donald Light and Russell Morgan to American Cyanamid Co.
Decolorizing impure naphthenic acids. No. 2,301,285. Henry Kellog and Peter Gaylor to Standard Oil Development Co.
Method of producing nitrohydroxy aliphatic compounds. No. 2,301,259. Richard Cox to Hercules Powder Co.
Heat reaction product of shellac and material selected from group consisting of ethylene glycol and di-ethylene glycol in contact with hydrocarbon sulfate. No. 2,301,253. Solomon Caplan to Harvel Research Corp.
Rosin size stabilized against oxidation. No. 2,301,252. Jack Cassaday to American Cyanamid Co.
Art of manufacturing gelatin. No. 2,301,242. Rene Bilaudot.
Method of producing erythritol tetranitrate. No. 2,301,231. Charles Spaeth to E. I. du Pont de Nemours & Co.
Acceleration of phosphate coating with quinone. No. 2,301,209. Robert Gibson to Parker Rust-Proof Co.
Manufacture of terphenyl derivatives. No. 2,301,206. Harold France, Isidor Heilbron, and Donald Hey to Imperial Chemical Industries Ltd.
Sulfanilyl guanylureas and process for making them. No. 2,303,972. Philip S. Winnek to American Cyanamid Co.
Method of making luminescent material. No. 2,303,963. Otto Uhle to Eastman Kodak Co.
Process for producing unsaturated aliphatic compounds. No. 2,303,842. Philip M. Kirk and Louis C. Jones to American Cyanamid Co.
Method of preventing wax deposits in tubing. No. 2,303,823. Clarence J. Coberly to Kobe Inc.
Process of treating wool greases. No. 2,302,679. Isaac J. Drekter and Lester Conrad to American Cholesterol Products, Inc.
Organic phosphorus compound-bearing lubricant. No. 2,302,703. Bert Lincoln and Gordon Byrkit to Continental Oil Co.
Process of improving lubricating oils to decrease sludge formation and also to decrease their tendency to cause corrosion of metal surfaces. No. 2,302,708. Sidney Musher to Musher Foundation, Inc.
Alkylation of aromatic compounds. No. 2,302,721. Louis Schmerling to Universal Oil Products Co.
Compounds of the class consisting of the di-cyclo-alkylol ethers of Bz-2, Bz-2'-dihydroxy-dibenzanthrone, and their sulfation products. No. 2,302,733. Charles Young and William Gey to E. I. du Pont de Nemours & Co.
Dithiocarbamates. No. 2,302,749. Russell Dean to American Cyanamid Co.
Isothioureas and process for making them. No. 2,302,762. Charles Graenacher, Richard Sallmann, and Otto Albrecht to Society of Chemical Industry in Basle.
Ammeline condensation products. No. 2,302,765. John Grim to American Cyanamid Co.
N. N'-Polymethylene-bis-o-hydroxybenzamide-modified polyamides. No. 2,302,819. Gordon Vaala to E. I. du Pont de Nemours & Co.
Fortification and decarbonizing of sulfuric acid. No. 2,302,825. Cecil Wilde and Earl Ross to Stauffer Chemical Co.
Hydrohalides of substituted isothioureas and a process of preparing them. No. 2,302,885. Ludwig Orthner and Gerhard Balle, Georg Dittus, and Hermann Wagner to General Aniline & Film Corp.
Manufacture of maleic anhydride. No. 2,302,888. Frank Porter to The Solvay Process Co.

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Method of producing a sealing deposit in a place to be sealed which comprises introducing into the place an aqueous solution containing from 0.05 to 0.8 per cent of aluminum sulfate and from 0.05 to 6 per cent of sodium silicate, and transforming the said solution into a gel in situ by electrolysis sealing the said place. No. 2,302,-913. Hans Reimers to James W. Rebbeck and to Thomas Griswold, Jr.

Method of continuously hydrofining fatty acid esters. No. 2,302,994. Marion Gwynn.

Polyvalent lactams. No. 2,303,177. Paul Schlack.

Quaternary ammonium compound and process of making the same. No. 2,303,191. Alfred Baldwin and Henry Piggott to Imperial Chemical Industries Ltd.

Electrolysis of sugars. No. 2,303,210. Ralph Hales to Atlas Powder Co.

Derivatives of dihalogen hydroxy benzoic acids and process for the manufacture of the same. No. 2,303,337. Max Dorhn and Paul Diedrich to Schering Corp.

Method for modifying organic bodies to raise the transition temperature therein from nonfluid to fluid phase and the composition. No. 2,303,348. Michael W. Freeman and Joseph Katz. Katz to Freeman.

Amide. No. 2,303,366. Morris Katzman to The Emulsol Corp.

Poly-Alkylol ketones and derivatives, and process of making same. No. 2,303,370. Joseph H. Kugler, Howard C. Brinker and Robert J. McCubbin to Minnesota Mining and Mfg. Co.

Process and reagent for resolving emulsions. No. 2,303,414. Truman B. Wayne.

Production of hydrogen chloride. No. 2,303,537. Frank L. Frost, Jr. to E. I. du Pont de Nemours & Co.

Method of separating impurities from lubricating oils which comprises admixing therewith a compound of the guanidine series and filtering the same. No. 2,303,546. Herbert H. Gregor.

Method for making bromo-chloralkanes. No. 2,303,549. Amos G. Horney to Air Reduction Co., Inc.

Dehydrogenation of cyclohexanols. No. 2,303,550. Augustus S. Houghton and Homer E. McNutt to Allied Chemical & Dye Corp.

Treatment of organic sulfates. No. 2,303,582. Kenneth L. Russell, Gilvert de Wayne and Adam Carr Bell to Colgate-Palmolive-Peet Co.

Calcium tartrate production. No. 2,303,602. Geza Braun to Standard Brands Inc.

Tartaric acid production. No. 2,303,603. Geza Braun to Standard Brands Inc.

Treatment of tartarous liquors. Geza Braun to Standard Brands Inc.

Rochelle Salt Production. No. 2,303,605. Geza Braun to Standard Brands Inc.

Cream of tartar production from acid extract of tartarous material. No. 2,303,606. Geza Braun to Standard Brands Inc.

Tartaric acid production from calcium tartrate. No. 2,303,607. Geza Braun to Standard Brands Inc.

Catalyst recovery. No. 2,303,680. Frank G. Brueckmann to Standard Oil Co. (Corp. of Indiana).

Preparation of ammonium allantionate. No. 2,303,765. William Robinson to Claude R. Wickard, Sec. of Agric. and his successors in office.

Electrostatic separation of mixtures. No. 2,305,872. Richard Heinrich.

Dry trituration. No. 2,305,828. Alfred Kuhn.

Process for producing carbon tetrachloride. No. 2,305,821. Josef Wimmer.

Solid coherent layer of pure fulgides and a base. No. 2,305,799. Otto Vierling.

Gaseous fuel for use with oxygen in a blow pipe. No. 2,305,753. Samuel White to Albert Stuart Allen to Byron D. Kuth.

Gaseous fuel to be used with oxygen in a blow pipe. No. 2,305,752. Samuel White to Albert Stuart Allen, and to Byron D. Kuth.

Manufacture of derivatives of p-sulfonamido aniline. No. 2,305,751. Kurt Warnat to Hoffmann-La Roche Inc.

Reaction product of red lead. No. 2,306,352. Harry Burrell to Ellis-Foster Co.

Gamma-acetyl-gamma-isopropenyl limelic acid and method for its preparation. No. 2,306,351. Herman Bruson to The Resinous Products & Chemical Co.

Synthesis of hydroxy-citrolellal. No. 2,306,332. Alvin Flisik and Leonard Nicholl to Kay-Fries Chemicals, Inc.

Oil filter containing a salt of an amino acid. No. 2,306,325. Philip Allam to Simmonds Development Corporation Ltd.

Process of making fatty oil products by heating linseed oil having no conjugated unsaturated groups with maleic anhydride in presence of an acid. No. 2,306,281. John Rust to Ellis-Foster Co.

Luminescent material. No. 2,306,271. Humboldt Leverenz to Radio Corporation of America.

Luminescent material. No. 2,306,270. Humboldt Leverenz to Radio Corporation of America.

Degasifying viscous compositions. No. 2,306,265. Robert Heald to Colgate-Palmolive-Peet Co.

Liquid catalyst of the Friedel-Crafts type. No. 2,306,261. Chester Crawford and William Ross to Shell Development Co.

Preparing N-methylol derivative of a secondary organic amide. No. 2,306,185. Joseph Pikl to E. I. du Pont de Nemours & Co.

Removing titanium tetrachloride from vaporized mixture produced by chlorination of titanium bearing material. No. 2,306,184. Alphonse Pechukas to Pittsburgh Plate Glass Co.

Treatment of water. No. 2,306,147. Edward Williams to Ella E. Williams.

Preparing metal surfaces to resist staining or corrosion. No. 2,306,-143. Arthur Stevenson to Continental Can Co., Inc.

Polymerization of unsaturated alcohol esters of crotonic acid. No. 2,306,139. Maxwell Pollack to Pittsburgh Plate Glass Co.

Polymerization of unsaturated alcohol diesters of oxalic acid. No. 2,306,136. Irving Muskat to Pittsburgh Plate Glass Co.

Method of manufacturing light polarizing material. No. 2,306,108. Edwin Land and Howard Rogers to Polaroid Corp.

Electrostatic separator for ores and other substances. No. 2,306,105. Georg Grave, Alfred Stieler, and Theodor Bantz.

2-methyl-3-dihydrophytyl-1, 4-naphthoquinone. No. 2,306,093. Max Tishler to Merck & Co., Inc.

Chlorinated anacardic material. No. 2,306,077. Emil Novotny and George Vogelsang to Durite Plastics, Inc.

Lubricating oil composition of relatively low, non-fugitive, non-reverting pour point. No. 2,306,017. Jacob Faust to L. Sonneborn Sons, Inc.

Preserving drying oil compositions. No. 2,306,016. Michael Eitelman to Allied Chemical & Dye Corp.

Spray drying process. No. 2,305,940. James Walsh to American Maize-Products Co.

Producing light sensitive systems of silver halides. No. 2,305,745. Ostap Stasiw.

Production of levulinic acid. No. 2,305,738. Georg Scheuing and Wilhelm Konz.

Calcium hydroxy formate production. No. 2,305,734. Erich Rabald and Fritz Johannessohn to Rare Chemicals, Inc.

Recovery of pepsin from acid digestion mixtures of animal stomach linings containing mucin and mucosa. No. 2,305,714. Havard Keil to Armour and Co.

Making photographic positives, including illuminating a layer of fulgides. No. 2,305,693. Ludwig Hanel.

Producing methacrylic acid methyl ester. No. 2,305,663. Ledwig Beer and Paul Halbig.

Laminating films of cellulose acetate. No. 2,305,658. Bjorn Andersen and Ralph Ball to Celanese Corporation of America.

Decolorizing and purifying liquids capable of reacting with aluminum to form an hydroxyl gel. No. 2,305,657. Walter Aehneit.

Thermally decomposing acetone to ketene. No. 2,305,652. Winston Walters and Francis Rice. Walters to Rice.

Refining animal and vegetable oils containing free fatty acids and other deleterious materials. No. 2,305,619. William Kelley and Mead Cornell Delley to The Lummus Co.

Preparation of nitrophenyl amines. No. 2,305,573. Kenneth Klipstein and Alfred Hill to American Cyanamid Co.

Reconditioning alkali metal hydroxide solution containing solubility promoter for mercaptans and resinous emulsifier. No. 2,305,550. Alan Nixon and Orris Davis to Shell Development Co.

Extracting weak organic acids from solution in water-immiscible organic liquid by means of liquid strong alkaline solution. No. 2,305,549. Alan Nixon to Shell Development Co.

Cyanoethylated aryl acetonitriles. No. 2,305,529. William Hester and Herman Bruson to The Resinous Products & Chemical Co.

Gamma-acetyl-gamma-isopropenyl pimelonitrile and method for its preparation. No. 2,305,513. Herman Bruson to The Resinous Products & Chemical Co.

Process of preparing beta-indolal-hydantoin. No. 2,305,501. Marvin Spielman to Abbott Laboratories.

Process of separating fatty acids from tall oil which has been hydrogenated. No. 2,305,498. Ernest Segessemann to National Oil Products Co.

Method of carbonizing electrodes. No. 2,305,478. Emerson Kern to Bell Telephone Laboratories, Inc.

Quaternary salts of scopolamine and process for their production. No. 2,305,460. Georg Scheuing and Wilhelm Krauss.

Water-soluble heterocyclic therapeutic compounds. No. 2,305,260. Jonas Kamlet to Merck & Co., Inc.

Process for the recovery of antimony trichloride. No. 2,305,248. Alfred Fleer and Russell Millar to Shell Development Co.

Separating capryl alcohol and methyl-n-hexyl ketone. No. 2,305,236. Herman Bruson to The Resinous Products & Chemical Co.

Hydraulic fluid. No. 2,305,228. John Woodhouse and Kenneth Walker to E. I. du Pont de Nemours & Co.

Curing siccative compositions. No. 2,305,215. Walter Durant to American Cyanamid Co.

Method and apparatus for solidifying molten sulfur. No. 2,305,209. Herbert Treichler, Harry Swem and James Schwab to Texas Gulf Sulfur Co.

Process for conversion of molten substances into finely divided form. No. 2,305,172. Otto Landgraf to Chemical Marketing Co., Inc.

Producing sensitive grainless silver bromide layer, proof against blackening by photographic developer in non-actinic light. No. 2,305,169. Friedrich Lierg.

Ketoguanamines. No. 2,305,118. Jack Thurston to American Cyanamid Co.

Removing water from aqueous acetonitrile. No. 2,305,106. Henry Pratt to Imperial Chemical Industries Ltd.

Catalytic hydrogenation of alkyl esters of hydroxy acetic acid. No. 2,305,104. Fred Pardee, Jr. to E. I. du Pont de Nemours & Co.

Purification of aliphatic dinitrile. No. 2,305,103. Walter Osgood to E. I. du Pont de Nemours & Co.

Higher fatty acid esters of p-toluene sulfonic acid salts of amino alcohols. No. 2,305,083. David Jayne, Jr. and Harold Day to American Cyanamid Co.

Flammable material incorporating an alkylolamine guanidine phosphate to render the material fireproof. No. 2,305,035. Charles Rosser to Sylvania Industrial Corp.

Process of making anhydrous lime powder. No. 2,305,031. Russell Rarey and Edmund Powers to Marble Cliff Quarries Co.

Interpolymerization of a conjugated butadiene and aliphatic monoolefines. No. 2,305,007. Heinrich Hopff and Curt Rautenstrauch to Jasco Incorporated.

Method of lowering contrast of dye images. No. 2,304,987. Richard Yound to Eastman Kodak Co.

Purification of trimethylol methyl-methane. No. 2,304,985. Joseph Wyler to Trojan Powder Company.

Fog inhibitor for photographic emulsions. No. 2,304,962. Samuel Sheppard and Waldermar Vanselow to Eastman Kodak Co.

Photographic developing agent. No. 2,304,953. Willard Peterson to Eastman Kodak Co.

Photographic developer containing aromatic alcohols. No. 2,304,925. Edwin Jelley to Eastman Kodak Co.

Polymerization of vinyl compounds with acetylene alcohols. No. 2,304,917. Heinrich Hopff and Curt Rautenstrauch to General Aniline & Film Corp.

Determining density of inaccessible fluid within a container. No. 2,304,910. Donald Hare to The Texas Co.

Producing light-sensitive systems of silver halides. No. 2,304,900. Ostap Stasiw.

Fuel for high-compression multicylinder internal combustion engines. No. 2,304,883. John Campbell to General Motors Corp.
Treating organic by-product compound containing at least one ester to obtain acid content from the ester. No. 2,304,872. Gustave Bachman and Howard Tanner to Eastman Kodak Co.
Treating fatty acid mixture derived from triglyceride oil, containing unsaturated fatty acids, and hydrogenation inhibiting factors. No. 2,304,842. John McKee and Orlando Graziani to Armour and Co.
Method for the preparation of hydroxy steroid derivatives. No. 2,304,836. Russell Marker to Parke, Davis & Company.
Amides of heterocyclic carboxylic acids. No. 2,304,830. Morris Katzman to The Emulsol Corp.
Transfer of solid material between zones of different pressures. No. 2,304,827. Joseph Jewell to the M. W. Kellogg Co.
Diaryl-guanidine and aryl-biguanide salts of dinitrophenols. No. 2,304,821. John Hansen and Frank Smith to The Dow Chemical Co.
Substituted monoamides of aliphatic dibasic acids. No. 2,304,820. William Hanford, James Kirby and David Woodward to E. I. du Pont de Nemours & Co.
Process of treating water by adding dodecyl amine. No. 2,304,805. Wayne Denman to Dearborn Chemical Co.
Treatment of organic materials. No. 2,304,767. John Ross and Dwight Potter to Colgate-Palmolive-Peet Co.
Adhesive. No. 2,304,730. Paul Davidson and Julius Adams to Old Colony Envelope Co.
Stabilization of polymerizable vinyl aromatic compounds. No. 2,301,-728. Raymond Boyer and Louis Rubens to The Dow Chemical Co.
Process for the production of polymeric compounds. No. 2,304,687. Max Hagedorn.
In process isolating cannabidiol from red oil obtained from hemp, the step which consists in treating the red oil with 3, 5-dinitrobenzoyl chloride to form cannabidiol bis-3, 5-dinitrobenzoate. No. 2,304,-669. Roger Adams.
Operation of catalytic processes. No. 2,304,653. Robert Pyzel and Clarence Gerhold to Universal Oil Products Co.
5-substituted tetrahydrotriazone. No. 2,304,624. William Burke to E. I. du Pont de Nemours & Co.
Reaction of ethylenimines with thiols and product thereof. No. 2,304,-623. Gerard Berchet to E. I. du Pont de Nemours & Co.
Method for the production of sebacic acid and methylhexylcarbinol. No. 2,304,602. Walther Schrauth and Karl Hennig to E. I. du Pont de Nemours & Co.
Production of adhesives. No. 2,304,600. Hans Scheuermann to Plaskon Co., Inc.
Process for the production of racemic menthol. No. 2,304,563. George Gerlach and Robert Shelton to Vick Chemical Co.
Manufacture of thiazyl sulfur halides. No. 2,304,557. William Ebelke to United States Rubber Co.
Production of anhydrous aluminum sulfate. No. 2,304,519. William Wilson.
Process of treating materials comprising albumin such as hair, bristles, and the like. No. 2,304,478. Salo Rosenzweig.
High molecular weight aliphatic diamide of sebacic acid and process of preparing same. No. 2,304,475. William Pool to Armour and Co.
Manufacture of yeast. No. 2,304,471. Ejnar Meyer and Percival Chaffe to Standard Brands Inc.
Process for treating and reducing chromium chloride. No. 2,304,463. Charles Maier to The Dow Chemical Co.
Blending edible fats. No. 2,304,452. Arne Gudheim to Lever Brothers Co.
Method of effecting chemical reactions involving formaldehyde. No. 2,304,431. Joseph Walker to E. I. du Pont de Nemours & Co.
Recovery of silver from scrap films. No. 2,304,427. Robert Sibley to Monsanto Chemical Co.
Thiazyl sulfides. No. 2,304,426. Robert Sibley to Monsanto Chemical Co.
Condensation product. No. 2,304,369. Willard Morgan and Earle McLeod to Arnold, Hoffmann & Co., Inc.
Separation of materials of different specific gravities. No. 2,304,352. Frank Griffiths, Erith Kent, and Frederick Meyer to Provident Trust Co. of Philadelphia.
Alkylation process. No. 2,304,290. Adrianus van Peski to Shell Development Co.
Tung oil substitute. No. 2,304,288. Raymond Swain to Interchemical Corp.
Process of recovering sulfuric acid from spent sulfuric acid. No. 2,304,280. Chester Read to Standard Oil Development Co.
Manufacture of adhesive films. No. 2,304,263. Willy Luty to The Licoro Corp.
Treatment of well drilling fluids. No. 2,304,256. Leon Huebel to National Lead Co.
Production of primary alkyl chlorides. No. 2,304,239. Hyym Buc to Standard Oil Development Co.
Method and means for controlling drilling muds. No. 2,304,232. Lorenz Ayers to National Lead Co.
Metallic salts of mahogany sulfonate and the process of making the same. No. 2,304,230. Francis Archibald, Elizabeth and John Holtzclaw to Standard Oil Development Co.
Multistage dehydroaromatization. No. 2,304,183. Edwin Layng and Robert Marschner to Standard Oil Co., and to M. W. Kellogg Co.
Sulfating process and apparatus therefor. No. 2,304,178. Harmon Keyes.
Chemical compound selected from the group consisting of the free acid form and the salts of a phosphonic acid. No. 2,304,156. Max Engelmann and Josef Pikl to E. I. du Pont de Nemours & Co.
Solution concentration system. No. 2,304,150. Robert Crawford.
Production of anhydrous aluminum sulfate. No. 2,304,133. William Wilson and Neil Sargent to Monsanto Chemical Co.
Fluid catalyst process and apparatus. No. 2,304,128. Charles Thomas to Universal Oil Products Co.
Emulsion and dispersion. No. 2,304,125. Richard Shutt and Ellsworth McSweeney to Kendall Refining Co.
Therapeutical zinc peroxide. No. 2,304,104. Walter Klabunde, Paul Magill, and Joseph Reichert to E. I. du Pont de Nemours & Co.
Protein composition. No. 2,304,102. Percy Julian, Andrew Engstrom, and Elmer Oberg to The Glidden Co.
Process of preparing zinc peroxide. No. 2,304,098. Newton Jones and Donald Notman to E. I. du Pont de Nemours & Co.
Preparation of alpha trioxymethylene. No. 2,304,080. Charles Frank to E. I. du Pont de Nemours & Co.
Cuprous oxide. No. 2,304,078. Joseph Drapeau, Jr. and Charles Rogers to The Glidden Co.
Dehydrated castor oil treatment. No. 2,304,074. Oscar Cherry to The Glidden Co.
Process for producing aldehydes. No. 2,304,064. John Scanlan and Daniel Swern.
Boriding refractory metal bodies. No. 2,307,005. Samuel Ruben.
Cellulosic film containing benzyl trimethyl ammonium laurate. No. 2,306,964. Theodore R. Latour to E. I. du Pont de Nemours & Co.
Deoxidizing agent for barium chloride bath furnaces. No. 2,306,912. Merrill A. Scheil to A. O. Smith Corp.
Protective covering paste comprising methyl cellulose, liquid paraffin, glycerine and water. No. 2,306,887. Rudolf Klose to Alien Property Custodian.
Manufacture of aluminum acetate. No. 2,306,826. Majer Mendelshon.
Film of polyvinyl alcohol containing a strip agent. No. 2,306,790. Frederick M. Meigs to E. I. du Pont de Nemours & Co.
Making fibrous siliceous product. No. 2,306,781. Carleton S. Francis, Jr. to Sylvania Industrial Corp.
Removing objectional color, odor and taste from fat-soluble vitamin-containing materials. No. 2,306,776. Loran O. Buxton to National Oil Products Co.
Compound of 1-acetyl-1-acetylamino acetone and 1-ethoxyacetyl-1-acetylamino acetone. No. 2,306,765. Eric T. Stiller to Merck & Co., Inc.
Hydrogenolysis of crude carbohydrates. No. 2,306,688. Julian K. Dale to Commercial Solvents Corp.
Preparation of monosodium glutamate. No. 2,306,646. Paul R. Shildneck to A. E. Staley Mfg. Co.
Fluorescent material. No. 2,306,626. Magdalene Huniger, Joseph Rudolph and Gunther Aschermann to General Electric Co.
Treatment of wine. No. 2,306,618. Julius H. Fessler to Pomoeno Products.
Thickening of solutions. No. 2,307,047. Morris Katzman and Frank Cahn to The Emulsol Corp.
N-Acylurethanes and their manufacture. No. 2,306,599. Kurt Engel and Kurt Pfaehler to J. R. Geigy O. G.
Imparting uniform, durable color to hardened concrete or mortar structure. No. 2,306,570. Edward W. Scripture, Jr.
Manufacture of fluorescent material. No. 2,306,567. Willard A. Roberts to General Electric Co.
Preparation of phytosterol glucosides. No. 2,306,547. David P. Langlois to A. E. Staley Mfg. Co.
Dissolving, softening, gelatinizing and swelling agents. No. 2,306,440. Winfrid Hentrich, Erik Schirm and Rudolf Endres to Patchem A.-G. zur Beteiligung an Patenten und Sonstigen Erfindungsrechten auf Chemische Verfahren.
Production of ferric sulfate. No. 2,306,425. John G. Bevan to Guggenheim Bros.
Grinding and cutting body. No. 2,306,423. Hans Bernstorff and Gustav Jaeger to Alien Property Custodian.
Manufacture of diene copolymers. No. 2,306,411. Frank K. Schoenfeld to The B. F. Goodrich Co.
Heat-responsive synthetic polymer element. No. 2,306,384. Walter H. Freygang to Specialties Development Corp.
Composition comprising water, 8% glycerol and 0.1% to a phenyl biguanide. No. 2,306,371. Thomas F. Banigan to E. I. du Pont de Nemours & Co.
Production of ethylene oxide. No. 22,241. Theodore E. Lefort to Carbide and Carbon Chemicals Corp.
Preparing cyanomethyl chloroformate. No. 2,307,679. Ingenuin Hechenbleikner to American Cyanamid Co.
Production of ozokeritelike substances. No. 2,307,675. Ernst Hantge and Josef Jannek.
Reducing sulfanilamido-amino-pyridines. No. 2,307,650. Edmond Tisza and Bernard Duesel to Nepera Chemical Co., Inc.
Production of a cyano-imino compound. No. 2,307,643. Frank Signaigo to E. I. du Pont de Nemours & Co.
Method of making organic thionitrates. No. 2,307,624. Richard George to Socony-Vacuum Oil Co., Inc.
Insulating material, mica flakes bonded together with a mixture of shellac and gum elemi. No. 2,307,587. Lawrence Hill and Arthur Brown to Westinghouse Electric & Mfg. Co.
Non-corrosive liquid, suitable for use in heat exchange devices containing iron and solder. No. 2,307,577. Frederick Downing to E. I. du Pont de Nemours & Co.
Controlled hydrohalogenation of unsaturated organic compounds. No. 2,307,552. William Vaughan and Frederick Rust to Shell Development Co.
Portland cement containing sulfonated aminohydroxy triphenylmethane dye. No. 2,307,485. Robert Booth to American Cyanamid Co.
Magnesium oxide hot process for silica removal from water. No. 2,307,466. Charles Noll and John Maguire to W. H. & L. D. Betz.
Abrasive article comprising abrasive grains bonded by a protein. No. 2,307,461. Durward Guth to Minnesota Mining & Mfg. Co.
Clarifying murky solutions capable of being foamed into a stable semi-rigid reticulum. No. 2,307,453. Glenn Davidson.
Trimethyl-hydroquinone condensation product and process for the manufacture of same. No. 2,307,010. John Aeschlimann to Hoffmann-La Roche, Inc.
Transparent film. No. 2,307,057. James Mitchell to E. I. du Pont de Nemours & Co.
Breaking agent for emulsions. No. 2,307,058. August Moeller.
Process for hydrogenating edible oils. No. 2,307,065. William Paterson to Lever Brothers Co.
Process for preparation of stiffening material. No. 2,307,178. William Whitehead to Celanese Corporation of America.
Stable shadow producing composition for cholecystographic purposes consisting of di-sodium tetraiodophenolphthalein dissolved in a caustic soda solution having a pH of about 8 to 9. No. 2,307,189. William Bell and Jules Gilbert.
Production of indoles. No. 2,307,244. Louis Spiegler to E. I. du Pont de Nemours & Co.

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Building material consisting of a finely divided mixture of cement clinker and a 3 to 5% addition of hydrated ferrous sulfate. No. 2,307,270. Willard Hodge to Mellon Institute of Industrial Research.

Process for making electrical resistors. No. 2,307,288. George Megow to Allen-Bradley Co.

Flotation of quartz and other acidic minerals. No. 2,307,397. Stuart Falconer and Stephen Erickson to American Cyanamid Co.

Polymerization of polyhydric alcohol esters of monocarboxylic acids. No. 2,308,236. Maxwell Pollack, Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Isopropylaminomethyl-(3, 4-dioxyphenyl) carbinol. No. 2,308,232. Georg Scheuing and Otto Thoma.

Method of making composite articles. No. 2,308,305. Morris W. Reynolds to Acheson Colloids Corp.

Improving dark-colored higher fatty acids. No. 2,308,431. Robert L. Brandt to Colgate-Palmolive-Peet Co.

Production adherent cement lining on a section of a well bore penetrating an acid-soluble earth or rock formation. No. 2,308,-425. Chas. A. Prince to The Dow Chem. Co.

Making aralkyl iodides and corresponding alcohols. No. 2,308,419. Robert G. Heitz and John E. Livak to The Dow Chemical Co.

Process for manufacturing superphosphates. No. 2,308,220. William Waggaman.

Making alcohol from olefines by esterifying the olefines with sulfuric acid and hydrolyzing the esters. No. 2,308,219. Hans Vesterdal and Steward Fulton to Standard Alcohol Co.

Producing unsaturated, monohydric, primary alcohol. No. 2,308,192. Louis Mikeska and Erving Arundale to Standard Oil Development Co.

Treatment of wells by charge of acid. No. 2,308,414. Wm. B. Campbell to The Dow Chem. Co.

Oxide coated cathode. No. 2,308,389. George F. Reyling to Radio Corp of Amer.

Preparation of carboxylic acid esters and lactone. No. 2,308,385. Richard Pasternack and Ray Arthur Patelski to Charles Pfizer & Co.

Process for removing dust from light sensitive photographic emulsions. No. 2,308,005. Ehrhard Hellmig and Hans Kammerl to General Aniline & Film Corp.

Xanthone manufacture. No. 2,307,982. Paul Bachman and Berndt Hammaren to General Chemical Co.

Purification of organic compounds. No. 2,307,953. Dwight Potter to Colgate-Palmolive-Peet Co.

Removal of formaldehyde from mixtures containing the same. No. 2,307,937. Carl Marvel to E. I. du Pont de Nemours & Co.

Preparation of aldehydes. No. 2,307,934. Donald Loder and William Gresham to E. I. du Pont de Nemours & Co.

Preparation of hydroxylamine. No. 2,307,929. Robert Joyce to E. I. du Pont de Nemours & Co.

Hydrolysis of meta-dioxanes. No. 2,307,894. Louis Mikeska to Standard Oil Development Co.

Process for the manufacture of leuco esters. No. 2,307,893. Walter Mieg and Franz Wierners to General Aniline & Film Corp.

Autocondensation product of high molecular alkyl aryl ketones and process for producing it. No. 2,307,891. Eugene Lieber to Standard Oil Development Co.

Manufacture of chlorohydrins. No. 2,307,875. Hyym Buc and Clifford Muessig to Standard Oil Development Co.

Process comprising the reaction of an olefinic compound with a substance selected from the group consisting of aldehydes and compounds decomposing, under the conditions of the reaction, to yield aldehydes and a halogenated fatty acid which contains at least one halogen atom in the alpha position, and recovering the products of the reaction. No. 2,307,872. Erving Arundale and Louis Mikeska to Standard Oil Development Co.

Polymeric product and process. No. 2,307,817. Paul Austin to E. I. du Pont de Nemours & Co.

Nitrogenous hydrophilic ester of a water-soluble polybasic acid. No. 2,307,813. Truman Wayne.

Process for producing synthetic esters. No. 2,307,794. Wesley Jordan to The Sherwin-Williams Co.

Viscose containing 20% to 40% mica and 2% to 10% of 1-(1':9'-isothiazolanthrone-2'-carbonyl)-6-chloroanthraquinone, based on the cellulose, the said mica having been wet ground until at least 30% has a particle size of 50 to 100 microns (measured in the longest dimension), and at least 75% has a particle size of 20 to 150 microns. No. 2,307,760. John Creadick to E. I. du Pont de Nemours & Co.

Vitamin containing shortening. No. 2,307,756. James Blaso to Natural Vitamin Corp.

Acrolein-urea condensation products and process of producing same. No. 2,307,742. Karl Herstein to Acrolein Corp.

Production of alkyl halides. No. 2,308,170. Arthur Green and Charles Hemminger to Standard Oil Development Co.

Concentrating sulfuric acid containing carbonaceous material. No. 2,308,163. Frank Ferguson to Standard Oil Development Co.

Rapid drying oil having conjugated system from soybean oil. No. 2,308,152. Paul Boone.

Leather

Aluminum tanning process for hides. No. 2,301,637. Joseph Niedercorn and William Dawson to American Cyanamid Co.

Process tanning and dyeing leather. No. 2,303,477. Donald T. Kirby to E. I. du Pont de Nemours & Co.

Leather tanning and finishing. No. 2,303,209. John Marshall Grim to American Cyanamid Co.

Synthetic leather compound comprising liquid sodium silicate and rubber dust. No. 2,304,877. Joseph Birnbaum.

Tanning agent free of azo groups. No. 2,306,439. Winfrid Hentrich and Erik Schirm to "Unichem" Chemikalien Handels, A.-G. Zurich.

Metals, Alloys

High-carbon ferrous-base composition for producing articles by powder metallurgy. No. 2,301,805. Oscar Harder to The Globe Steel Abrasive Co.

Method of purifying crystalline alumina and an abrasive material made thereby. No. 2,301,706. Raymond Ridgway.

Process for producing metals forming difficultly volatile oxides. No. 2,301,663. Eduard Zinti and Wilhelm Morawietz.

Recovery from iron ore of secondary metal. No. 2,301,492. John Young to Plastic Metals, Inc.

Magnesium extraction process. No. 2,301,457. Philip Sadtler and Samuel Sadtler to Samuel P. Sadtler and Son, Inc.

Ferromagnetic article which is subjected to 500° temperature and adapted to remain magnetic at said elevated temperature. No. 2,301,366. Hellmut Bumm and Horst Muller.

Purification of high silicon iron alloys. No. 2,301,360. Joseph Brennan to Electro Metallurgical Co.

Forming laminated sheets, plates and other bodies of aluminum coated magnesium. No. 2,301,332. Ernest Scheller to Reynolds Metals Co.

Welding electrode comprising core of nickel and surrounding coating of copper. No. 2,301,320. Charles Phillips and Harry Pennington to C. E. Phillips and Company.

Concentration of mica. No. 2,303,962. Francis X. Tartaron and Allen T. Cole to Phosphate Recovery Corp.

Process for concentrating phosphate ores. No. 2,303,931. Ernest W. Greene and Charles W. Head to Phosphate Recovery Corp.

Treatment of Metals. No. 2,303,869. Frank B. Quinlan and Lloyd P. Grobel to General Electric Co.

Manufacture of metal fluorides. No. 2,303,783. Carlo Adamoli to Perosa Corp.

Method of determining gas content of molten brasses. No. 2,303,655. Orville C. Nutter.

Treatment of metal powders. No. 2,303,504. Cornelius J. Ryan to E. I. du Pont de Nemours & Co.

Resistance or fuse wire alloys. Nos. 2,303,401-405. Cecil Spencer Sivil to Baker & Co., Inc.

Method of making zircon refractories. No. 2,303,304. Henry Schleicher, Elizabeth and Steve Kopin to Scovill Mfg. Co., and to United States Metal Refining Co.

Alloy especially suited for uniting hard metal carbide bodies to steel bodies. No. 2,303,272. Roy Haskell to Fansteel Metallurgical Corp.

Alloy especially suited for uniting hard metal carbide bodies to steel bodies. No. 2,303,250. Clarence Balke to Fansteel Metallurgical Corp.

Alloy containing by weight 14 to 22% of cadmium, 0.5 to 3.0% of antimony, 3 to 10% of tin and a balance consisting substantially entirely of lead. No. 2,303,194. George Bouton, George Phillip, and Earle Schumacher to Bell Telephone Laboratories, Inc.

Alloy containing by weight 20 to 60% of tin, 0.5 to 3.0% of cadmium, 0.2 to 3.0% of antimony, 0.1 to 1.5% of copper, and a balance consisting substantially entirely of lead. No. 2,303,193. George Bouton, George Phillip Chatham and Earle Schumacher to Bell Telephone Laboratories, Inc.

Zinc alloy containing titanium. No. 2,303,105. Edmund Anderson and Gerald Edmunds to The New Jersey Zinc Company.

Process for simultaneously diphosphorizing and deoxidizing steel. No. 2,303,064. Rene Perrin to Societe d'Electro-Chimie, d'Electro-Metallurgie et des Aciers Electriques d'Ugine.

Magnesium base alloy containing from 1 to 20 per cent of thallium and from 0.01 to 1 per cent of cerium, the balance being magnesium. No. 2,302,968. John McDonald to The Dow Chemical Co.

Method and apparatus for roasting mercury ores and the like. No. 2,302,841. George Connolly to Nichols Engineering & Research Corp.

Process of precipitating gold from gold-bearing fumes in which the gold is in gaseous state. No. 2,302,725. Curt Uschmann to John T. Maney.

Bright-annealing metal in a furnace having non-oxidizing atmosphere. No. 2,305,831. Oskar Summa.

Recovering zinc and iron oxide from filter dust. No. 2,305,829. Heinrich Pieper.

Light magnesium alloy. No. 2,305,825. Arthur Burkhardt and Karl Riederer.

Method of wet grinding mica. No. 2,306,292. Francis Atwood to Atlantic Research Associates, Inc.

Providing particles of ferro-magnetic material with coating of insulation material. No. 2,306,198. Evert Verweij, Jan Hendrik de Boer, and Theodorus Spoor.

Process of removing iron oxide from natural silicon dioxide sand. No. 2,306,021. Raymond Knowles and Robert Frischmuth and Henry Colton to The Thompson Silica Co.

Preparation of artificial cryolite. No. 2,305,921. Josef Eringer.

Manufacturing hard and compact protective layers on magnesium and magnesium alloys. No. 2,305,669. Nikolai Budiloff and Willy Schnabel.

Electrode of magnetite and noble metal. No. 2,305,539. Robert Lowry to The Dow Chemical Co.

Concentrating kyanite from ores. No. 2,305,502. Francis Tartaron to Phosphate Recovery Corp.

Inhibiting agents in mineral picking acids. No. 2,305,358. Chester Read to Standard Oil Development Co.

Method of strengthening and improving cast iron by adding solid hydrocarbons. No. 2,305,222. John Martino.

Alloy to reduce anode corrosion. No. 2,305,133. Thomas Campbell to Chile Exploration Co.

Concentration of sulfide minerals, molybdenite ore, graphite and coal by flotation. No. 2,305,032. Chester Read to Standard Oil Development Co.

Heat treated and artificially aged magnesium-free aluminum base alloy. No. 2,304,949. Joseph Nock, Jr. to Aluminum Company of America.

Treating cast iron with graphitizing agent. No. 2,304,881. Charles Burgess and Herman Aufderhaar to Electro Metallurgical Co.

Preventing precipitation of dissolved iron in well water. No. 2,304,-850. Owen Rice to Hall Laboratories, Inc.

Method and agent for treating ore. No. 2,304,823. George Harrison to Thomas M. Courtis and Walter F. Courtis.

Heat resistant alloy. No. 2,304,353. William Griffiths and Leonard Pfeil to International Nickel Co., Inc.

Tin recovery process. No. 2,304,197. William Osborn to Phelps Dodge Corp.

Process for the conversion of metals into finely divided form. No. 2,304,130. Wilhelm Truthe to Chemical Marketing Co., Inc.
Removing iron from magnesium alloys. No. 2,304,093. Graydon Holdeman to The Dow Chemical Co.
Removing iron from magnesium. No. 2,304,092. Graydon Holdeman to The Dow Chemical Co.
Removal from cast iron of oxides other foreign inclusions. No. 2,306,976. Nicholas L. Pedersen.
Alloy consisting of 0.001% to 0.009% calcium, 0.001% to 0.009% magnesium, tin not exceeding 3% and the balance lead. No. 2,306,899. Albert J. Phillips and Albert A. Smith, Jr. to American Smelting & Refining Co.
Wrought alloy austenitic 10 to 25% chromium, 7-15% nickel and 3 to 40% carbon, stainless steel articles. No. 2,306,886. Vsevolod N. Krivobok to Rustless Iron aand Steel Corp.
Low melting point alloy consisting of lead, tin, bismuth and silver. No. 2,306,676. Samuel Turkus to American Smelting and Ref. Co.
Low melting point solder alloy consisting of lead, tin, bismuth and silver. No. 2,306,675. Samuel Turkus to American Smelting & Refining Co.
Low melting point alloy having high tensile strength and resistance to creep of lead, tin, and silver. No. 2,306,667. Albert A. Smith, Jr. to American Smelting & Refining Co.
Austenitic wrought stainless steel alloys. No. 2,306,662. Vsevolod N. Krivobok to Rustless Iron & Steel Corp.
Separating metals from solutions. No. 2,306,649. William Duncan—26 2/3% to George S. Pelton and Herbert E. Pelton.
Conversion of molten metal into fine particles of uniform size. No. 2,306,449. Otto Landgraf to Alien Property Custodian.
Rustless Iron. William B. Arness to Rustless Iron and Steel Corp.
Primary Cell. No. 2,306,409. Samuel Ruben.
Magnesium primary cell. No. 2,306,408. Samuel Ruben.
Dezincking galvanized scrap by means of an acid solution of zinc chloride. No. 2,307,625. John Gregory to E. I. du Pont de Nemours & Co.
Producing a white, platinumlike color chromium plate product and bath therefor. No. 2,307,551. Joseph Triska to Triskalite Corp.
Process of making copper base alloys. No. 2,307,512. James Kelly to Westinghouse Electric & Mfg. Co.
Silver catalyst in the form of porous pellets. No. 2,307,421. Johan Overhoff.
Copper alloy. No. 2,307,051. Felix Litton and Alan Seybolt to Electro Metallurgical Co.
Ore dressing. No. 2,307,064. Raymond Patterson to Powder Metals and Alloys, Inc.
Method of extinguishing burning light metals. No. 2,307,083. Richard Thurne to The Dow Chemical Co.
Drawing Be-containing alloys. No. 2,307,243. George Slagle to The Beryllium Corp.
Art of producing magnetic material. No. 2,307,391. Guerney Cole and Robert Davidson and Victor Carpenter to The American Rolling Mill Co.
Silver catalyst and method of making the same. No. 2,307,421. Johan Overhoff.
Production of metallic magnesium. No. 2,307,418. Joseph D. Hanawalt and John S. Peake to The Dow Chemical Co.
Process of reducing metallic oxides. No. 2,307,997. Gilbert Dill.
Hard, high-tensile strength alloy suitable for high speed cutting tools or the like, which comprises 10% to 40% zirconium, 3% to 20% columbium, 1% to 8% tantalum, 3% to 15% titanium, and the balance, iron. No. 2,307,960. Charles Schafer.
Recovery of metal salts. No. 2,307,944. William Osborn, Sidney Tuwiner, and John Smith to Phelps Dodge Corp.
Low temperature protective covering for iron or steel. No. 2,308,070. Albert Frey.

Paint, Pigments

Titanium oxide production. No. 2,301,412. John Keats and Henry Stark to E. I. du Pont de Nemours & Co.
Process of preparing titanium dioxide. No. 2,303,307. Peter Tillmann, Friedrich Raspe to Titan Company, Inc.
Process for the manufacture of titanium dioxide. No. 2,303,306. Peter Tillmann, Friedrich Raspe and Joseph Heinen to Titan Company, Inc.
Preparation of titanium dioxide. No. 2,303,305. Peter Tillmann, and Friedrich Raspe to Titan Company, Inc.
Pigment and method of preparing same. No. 2,302,718. Robert Ruthruff.
Production of selenium red pigment. No. 2,306,109. Robert Long to The Harshaw Chemical Co.
Dry color composition. No. 2,305,379. Stanley Detrick and Joseph Lang to E. I. du Pont de Nemours & Co.
Removing impurities from titanium oxide pigments. No. 2,305,368. Robert Whitten to E. I. du Pont de Nemours & Co.
Organic pigment. No. 2,305,088. Roy Kienle and William Gerdsen to American Cyanamid Co.
Method of improving brilliance and color of titanium dioxide. No. 2,304,947. Reginald Monk to American Zinc, Lead & Smelting Co.
Manufacture of titanium dioxide pigments. No. 2,304,719. Isaac Weber and Arthur Bennett.
Production of titanium oxide pigments. No. 2,304,110. Robert McKinney and Henry Stark to E. I. du Pont de Nemours & Co.
Production of TiO_2 Pigments. No. 2,307,048. John Keats to E. I. du Pont de Nemours & Co.

Paper and Pulp

Pulp composition and paper. No. 2,301,452. Joseph Plumstead to West Virginia Pulp & Paper Co.
Chemical recovery system for pulp mills. No. 2,303,811. John Badenhausen ½ to Day and Zimmermann Inc.
Stabilizing solution of tetra-alkyl lead compounds. Nos. 2,303,818-820. Troy L. Cantrell and Carlton L. Suplee to Gulf Oil Corp.
Method of making sulfite pulp. No. 2,305,493. Donald Porter and Walter Swanson to Paper Patents Co.
Process for bleaching wood pulp. No. 2,307,137. Absalom Kennedy to Steward Lloyd.

Separation and recovery of potassium compounds from magnesium bisulfite cooking liquor for wood. No. 2,308,364. Raymond S. Hatch to Weyerhaeuser Timber Co.

Petroleum

Material for treating oil wells. No. 2,301,875. Harrison Holmes to E. I. du Pont de Nemours & Co.
Paraffin wax product inhibited against formation of deleterious color upon prolonged exposure to light. No. 2,301,806. Lyle Hamilton and Robert Moran and Albert Cattell to Socony-Vacuum Oil Co., Inc.
Process of desulfurizing hydrocarbons. No. 2,301,802. Robert Burk and Everett Hughes to The Standard Oil Co.
Refining paraffin. No. 2,301,801. Robert Burk and Everett Hughes to The Standard Oil Co.
Stabilizer for oils. No. 2,301,795. Wayne Proell to Standard Oil Co.
Increasing stability to oxidation of viscous petroleum oil. No. 2,301,794. Wayne Proell and Richard McClaughry to Standard Oil Co.
Converting heavy hydrocarbon oil into gasoline of high knock rating. No. 2,301,735. Ralph Melaven and Rodney Shankland to Standard Oil Company.
Converting heavy hydrocarbon oils into gasoline. No. 2,301,734. Ralph Melaven and Rodney Shankland to Standard Oil Co.
Conversion of hydrocarbons into gaseous olefins. No. 2,301,727. Hans Klein, Ferdinand Haubach, and Wilhelm Hofeditz.
Recovery of pure phenols from crude phenols. No. 2,301,709. Carl Rumscheidt and Hinrich Havemann.
Production of polymerization or condensation products from unsaturated hydrocarbons. No. 2,301,668. Mathias Pier and Friedrich Christmann.
Production of unsaturated branched chain hydrocarbons from normal-paraffins and normal or branched chain olefins. No. 2,301,615. Joseph Chenicek and Kenneth Brown to Universal Oil Products Co.
Breaking petroleum emulsions. No. 2,301,609. Charles Bonnet to American Cyanamid & Chemical Corp.
Method of treating bitumens and/or crude petroleum. No. 2,301,595. Paul Washburn.
Removal of carbonyl sulfide from hydrocarbon fluids. No. 2,301,588. Walter Schulze and Graham Short to Phillips Petroleum Co.
Converting hydrocarbons into motor fuel. No. 2,301,548. Fred Koch to The Winkler-Koch Patent Co.
Purifying crude naphthenic acids containing wax. No. 2,301,528. Frederick Ewing to Union Oil Company of Calif.
Process of treating high pressure well distillates. No. 2,301,520. Samuel Carney to Phillips Petroleum Co.
Treatment of oil wells to prevent emulsification. No. 2,301,494. Gale Adams and Abraham Shapiro to Socony Vacuum Oil Co.
Process for converting normally gaseous hydrocarbons into motor fuel. No. 2,301,391. Frederick Frey to Phillips Petroleum Co.
Converting higher boiling hydrocarbons to lower boiling hydrocarbons. No. 2,301,349. Jesse Walton to Standard Oil Development Co.
Producing iso-mono-olefins from non-tertiary carbon-atom-containing mono-olefins. No. 2,301,342. Simpson Sumerford and Kenneth Laughlin to Standard Oil Development Co.
Process of preparing derivatives of petroleum hydrocarbon acid sludge. No. 2,301,335. Jere Showalter and Mehemmet Wiggen to Standard Oil Development Co.
Reducing viscosity of relatively heavy hydrocarbon oil. No. 2,301,322. Edward Reeves and Steward Hulse to Standard Oil Development Co.
Removal of hydrocarbon constituents having three and less carbon atoms in molecule from petroleum feed oils boiling in the range below 250°F. No. 2,301,304. James Maxwell and Kenneth Thorp to Standard Oil Development Co.
Production of high quality motor fuels of increased stability from petroleum oil fractions. No. 2,301,281. Jack Huggett to Standard Oil Development Co.
Process for production of petroleum phenols. No. 2,301,270. Robert Gerlicher to Standard Oil Development Co.
Catalyst for conversion of hydrocarbon oils. No. 2,301,257. Gerald Connolly to Standard Oil Development Co.
Process for removal of waxy constituents from feed oil. No. 2,301,246. Benjamin Brooks and Frederick Schumacher to Standard Oil Development Co.
Method for desulfurizing mineral oils. No. 2,303,970. Francis E. Wilkinson.
Conversion of hydrocarbon oils. No. 2,303,944. Theodore A. Mangeldorf to The Texas Company.
Method of sweetening sour petroleum distillates. No. 2,303,835. Roy L. Cholson.
Composition containing iso-olefin polymers. No. 2,303,069. William Sparks and Robert Thomas to Jasco, Inc.
Polymerization of olefins. No. 2,303,769. Donald R. Stevens and William A. Gruse to Gulf Research & Development Co.
Manufacture of high antiknock hydrocarbons. No. 2,303,735. Arthur R. Goldsby to The Texas Co.
Art of dewaxing oils. No. 2,303,721. David G. Brandt to Cities Service Oil Co.
Method of dewaxing mineral oils. No. 2,303,703. Benjamin Miller to Cities Service Oil Co.
Motor fuel manufacture. No. 2,303,663. Rodney V. Shankland to Standard Oil Co. (Corp. of Indiana).
Crude oil conditioning and separating process. No. 2,303,609. Samuel C. Carney to Phillips Petroleum Co.
Process for the regeneration of mercury catalysts. No. 2,303,279. Robert Isham to Danciger Oil & Refineries, Inc.
Process for catalytic hydrogenation of liquid hydrocarbons. No. 2,303,118. Frederick Frey to Phillips Petroleum Co.
Multistage catalytic conversion of hydrocarbons. No. 2,303,107. Wayne Benedict to Universal Oil Products Co.
Catalytic reforming of hydrocarbon oils. No. 2,303,083. Paul Kuhl to Standard Catalytic Co.
Process of refining white oil. No. 2,303,077. Albert Giraitis to Standard Oil Development Co.

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Process for catalytic cracking of hydrocarbon oils. No. 2,303,076. Per Frolich to Standard Oil Development Co.
Catalytic hydrogenation process. No. 2,303,075. Frederick Frey to Phillips Petroleum Co.
Stabilization and protection of hydrocarbon compositions. No. 2,303,050. Minor Jones to Standard Oil Development Co.
Catalytic treatment of hydrocarbons. No. 2,303,047. Charles Hemminger to Standard Oil Development Co.
Process of desalting crude oil. No. 2,302,916. Emory Skinner to Socony-Vacuum Oil Co., Inc.
Preparing amines of petroleum hydrocarbons. No. 2,305,830. Elmar Profft.
Process for breaking petroleum emulsions. No. 2,306,329. Melvin De Groote and Bernhard Keiser and Charles Blair, Jr. to Petrolite Corp., Ltd.
Production of branched chain hydrocarbons in the absence of any substantial hydrocarbon decomposition. No. 2,306,253. Frank McMillan to Shell Development Co.
Conversion of hydrocarbon stock into other hydrocarbons. No. 2,306,218. Ernest Marks to The Atlantic Refining Co.
High melting point petroleum wax of high ductility yet substantially oil-free and non-tacky. No. 2,306,201. Everett Wiles to Bareco Oil Co.
Treatment of gasoline with solid adsorbent refining agents. No. 2,305,742. William Simpson and Charles Dryer to Universal Oil Products Co.
Treating cracked gasoline to prevent depreciation. No. 2,305,676. Joseph Chenicek to Universal Oil Products Co.
Treating olefin-containing hydrocarbon distillate to prevent depreciation. No. 2,305,675. Joseph Chenicek to Universal Oil Products Co.
Treating olefin-containing hydrocarbon distillate to prevent depreciation. No. 2,305,674. Joseph Chenicek to Universal Oil Products Co.
Treating olefin-containing hydrocarbon distillate to prevent depreciation. No. 2,305,673. Joseph Chenicek to Universal Oil Products Co.
Converting higher molecular weight hydrocarbons to lower molecular weight hydrocarbons. No. 2,305,635. Francis Rice and Winston Walters to Process Management Co., Inc.
Continuous cyclic process of catalytically cracking high boiling hydrocarbons by an endothermic reaction. No. 2,305,569. William Degnen to The M. W. Kellogg Co.
Steam cylinder lubricating oil. No. 2,305,560. Knapel Schiermeier to Shell Development Co.
Process for purifying oil. No. 2,305,464. Daniel Ashworth to The De Laval Separator Co.
Extreme pressure lubricant. No. 2,305,401. Bradshaw Armendt to Standard Oil Development Co.
Conversion of hydrocarbons into high anti-knock gasoline. No. 2,305,220. David Legg to The Lummus Co.
Resolving petroleum emulsions of the water-in-oil type. No. 2,305,067. Melvin De Groote to Petrolite Corp., Ltd.
Treatment of feed mixture for separation of vaporized oil constituents from unvaporized oil constituents. No. 2,305,046. Charles Tyson to Standard Oil Development Co.
Solvent treating process for the removal of lower boiling oils. No. 2,305,038. Frederick Schumacher to Standard Oil Development Co.
Compounded petroleum oil. No. 2,305,034. Raphael Rosen, Elizabeth and Ben W. Geddes to Standard Oil Development Co.
Production of gasoline from low boiling olefins and isoparaffins. No. 2,305,026. John Munday to Standard Oil Development Co.
Process for sweating crude solid waxes. No. 2,305,024. Harold Moyer to Standard Oil Development Co.
Catalytic cracking of hydrocarbon oil in presence of a finely divided regenerable catalyst. No. 2,305,004. Charles Hemminger to Standard Oil Development Co.
Conversion of hydrocarbons. No. 2,304,654. Robert Pyzel and Elmer Kanhofer to Universal Oil Products Co.
Conversion of hydrocarbon oil. No. 2,304,639. Charles Hussey to Universal Oil Products Co.
Art of cracking mineral oil. No. 2,304,507. Arthur Phelan.
Catalytic cracking. No. 2,304,398. Oliver Campbell to Sinclair Refining Co.
Catalytic cracking. No. 2,304,397. Oliver Campbell to Sinclair Refining Co.
Conversion of hydrocarbon oils. No. 2,304,289. Carl Tongberg to Standard Oil Development Co.
Diesel fuel. No. 2,304,242. Gould Cloud to Standard Oil Development Co.
Conducting catalytic conversion reactions. No. 2,304,203. Robert Pyzel and Clarence Gerhold to Universal Oil Products Co.
Hydrocarbon conversion. No. 2,304,189. Edwin McGrew to Universal Oil Products Co.
Manufacture of balanced motor fuel and aviation safety fuel. No. 2,304,187. Robert Marschner to Standard Oil Co.
Making hydrocarbon conversion catalyst. No. 2,304,168. Llewellyn Heard to Standard Oil Co.
Catalytic conversion of hydrocarbons. No. 2,304,154. Albert Doran to Dorex, Inc.
Conversion of hydrocarbons. No. 2,304,083. Robert Ruthruff to The Polymerization Process Corp.
Hydrocarbon conversion process. No. 2,304,070. Wayne Benedict to Universal Oil Products Co.
Desulfurization of hydrocarbon distillate. No. 2,306,993. Lawrence L. Lovell, Parker E. Malson and Louis F. Boullion to Shell Development Co.
Improving lubricating oils. No. 2,306,971. Elliott B. McConnell and Mohm M. Musselman to The Standard Oil Co. (Corp. of Ohio).
Desulfurizing hydrocarbons. No. 2,306,933. Robert E. Burk to Standard Oil Co. (Corp. of Ohio).
Preventing formation of gums and resins in organic liquids containing unsaturated hydrocarbons. No. 2,306,870. Alfred Engelhardt to Alien Property Custodian.
Caustic scrubbing of petroleum distillate oil. No. 2,306,843. William W. Reed to Socony-Vacuum Oil Co.
Process for breaking petroleum emulsions. No. 2,306,775. Charles M. Blair, Jr. to Petrolite Corp., Ltd.
Process for breaking petroleum emulsions. No. 2,306,718. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.
Fractionation of mixtures of hydrocarbons. No. 2,306,610. Richard M. Barrer.
Separating liquefiable hydrocarbon constituents from natural gas. No. 2,306,553. Benjamin Miller to Cities Service Oil Co.
Distillation of oil containing salts of hydrochloride acid. No. 2,306,484. John H. McClintock to Standard Oil Development Co.
Dehydrogenating hydrocarbons. No. 2,307,715. John Turkevich to Process Management Co., Inc.
Converting olefinic hydrocarbons to hydrocarbons of higher boiling points. No. 2,307,689. Edwin Layng to The Polymerization Process Corp.
Fume disposal in catalyst regeneration systems. No. 2,307,672. George Dunham to Socony-Vacuum Oil Co., Inc.
Lubricating oil composition. No. 2,307,615. Edwin Barth to Sinclair Refining Co.
Catalytic treatment of hydrocarbons. No. 2,307,610. Charles Thomas to Universal Oil Products Co.
Process for breaking petroleum emulsions. No. 2,307,495. Melvin De Groote and Bernhard Keiser to Petrolite Corporation, Ltd.
Process for breaking petroleum emulsions. No. 2,307,494. Melvin De Groote and Bernhard Keiser to Petrolite Corporation, Ltd.
Gum inhibitor for gasoline comprising para hydroxy anil of methyl isobutyl ketone. No. 2,307,455. Melville Ehrlich to Allied Chemical & Dye Corp.
Catalytic cracking of hydrocarbon oil to produce gasoline. No. 2,307,434. Preston Veltman to The Texas Co.
Distillate rectification. No. 2,307,024. Samuel Carney to Phillips Petroleum Co.
Isomerization of N-paraffin. No. 2,307,053. Charles Lynch to Standard Oil Development Co.
Process for dewaxing hydrocarbons. No. 2,307,130. Robert Henry and James Montgomery to Phillips Petroleum Co.
Antiskinning and weather-resisting agents for drying oil compositions. No. 2,307,158. Harold Reynolds, Jr., Elizabeth, and Henry Kellog to Standard Oil Development Co.
Extreme pressure lubricant. No. 2,307,183. John Zimmer and Arnold Morway to Standard Oil Development Co.
Manufacture of diolefins. No. 2,307,240. Robert Ruthruff.
Solvent treating of mineral oils. No. 2,307,242. Joseph Savelli and John Powers to Standard Oil Development Co.
Extreme pressure lubricant. No. 2,307,307. Bernard Shoemaker to Standard Oil Co.
Removing resin- and gum-forming materials and sulfur from low-boiling hydrocarbons of nature of motor fuels. No. 2,308,249. Karl Susselbeck.
Improved wax modifying agent. No. 2,308,184. Eugene Lieber to Standard Oil Development Co.
Converting as.-diphenyl ethane into a hydrocarbon mixture consisting essentially of benzene and ethyl benzene. No. 2,308,415. Robert R. Dreisbach to The Dow Chem. Co.
Process for refining cracked gasoline. No. 2,308,001. William Forney to Cities Service Oil Co.
Treating hydrocarbon fluids. No. 2,307,895. Chester Naiman and John Graham to Standard Oil Development Co.
Lubricating hydrocarbon product comprising a lubricating hydrocarbon oil blended with from 0.2% to 5% of a vinyl phenol polymer in which the hydroxyl groups are esterified to render the polymer soluble in the hydrocarbon oil. No. 2,307,885. Anthony Gleason to Standard Oil Development Co.
Catalytic conversion process. No. 2,307,879. Paul Cornell to Standard Oil Development Co.
Cracking with synthetic catalysts. No. 2,307,878. Gerald Connolly to Standard Oil Development Co.
Process for recovery of petroleum resins. No. 2,307,873. Raymond Betts to Standard Oil Development Co.
Alkylation of paraffin hydrocarbons. No. 2,307,799. Carl Linn to Universal Oil Products Co.
Oil conversion using superior catalytic masses. No. 2,307,795. Kenneth Kearby to Standard Oil Development Co.
Treatment of hydrocarbons. No. 2,307,773. Gustav Egloff to Universal Oil Products Co.
Petroleum hydrocarbon emulsions. No. 2,307,744. Leon Liberthson to L. Sonneborn Sons, Inc.
Petroleum sulfonate products. No. 2,307,743. Leo Liberthson and Manuel Blumer to L. Sonneborn Sons, Inc.
Refining and treating cracked hydrocarbons. No. 2,308,172. William Hancock.
Treating liquid hydrocarbons to improve the antiknock quality. No. 2,308,063. Harry Drennan, James Farrell to Phillips Petroleum Co.

Resins, Plastics

Production of cobalt resinate of a polymerized rosin. No. 2,301,905. Fred Lane to Hercules Powder Co.
Translucent phenol formaldehyde resin capable of being drilled and machined at room temperatures without fracturing. No. 2,301,799. Wesley Thompson to Catalin Corporation of America.
Manufacture of vinyl resin film and sheeting. No. 2,301,368. Emmett Carber to Eastman Kodak Co.
Metal coated plastic material and method of producing the same. No. 2,303,871. Bernard F. Walker to Metaplast Corp.
Method of preventing sticking of vinyl resin sheets. No. 2,303,826. Elmer R. Derby to Monsanto Chemical Co.
Method of preventing sticking of vinyl resin sheets. No. 2,303,826. John M. De Bell to Monsanto Chemical Co.
Plasticizer and plastic composition. No. 2,302,743. Thomas Carruthers and Charles Blair to Carbide and Carbon Chemicals Corp.
Chewing gum base containing selectively hydrogenated pinene resin. No. 2,302,664. William H. Carmody to Carmody Research Laboratories, Inc.
Preparing shaped articles from vinyl resins. No. 2,305,859. Ernst Freund to Gemloid Corp.
Plasticizing material, mixed ester of polyethylene glycol, with an acid of low molecular weight. No. 2,306,315. William Lycan to Pittsburgh Plate Glass Co.

U. S. Chemical Patents

Off. Gaz.—Vol. 544, Nos. 2, 4—Vol. 545, Nos. 1, 2, 3, 4, 5—Vol. 546, Nos. 1, 2—p. 403

Resinous ester of monohydric alcohol and lactone of a heteropolymer of vinyl alcohol and unsaturated alpha, beta-dicarboxylic acid. No. 2,306,071. James McNally and Ressul Van Dyke to Eastman Kodak Co.
Production of urea-formaldehyde resins. No. 2,306,057. John Hayward to Bakelite Corp.
Making composite structure highly impervious to transmission of water vapor by film of vinyl resin. No. 2,306,046. Fred Duggan and Frazier Groff to Carbide and Carbon Chemicals Corp.
Method and apparatus for manufacture of synthetic resinous prisms. No. 2,305,945. Frank Williams and Charles Smith to The Univis Lens Co.
Composition for production of stable plastic masses, coating compositions. No. 2,305,920. Rudolf Endres.
Crystal-containing resinous materials. No. 2,305,417. Otto Hansen to Alexine Novelty Corp.
Phenolic amido resin. No. 2,304,729. Herman Bruson to The Resinous Products & Chemical Co.
Resinous anion exchange material. No. 2,304,637. Vernal Hardy to E. I. du Pont de Nemours & Co.
Process of washing resins. No. 2,304,610. James Taylor to Peninsular-Lurton Co.
Stabilization of vinyl aromatic resins. No. 2,304,466. Lorne Matheson, Raymond Boyer and James Amos to The Dow Chemical Co.
Hard infusible resinous condensation products. No. 2,306,924. Werner Zerweck, Max Schubert and Ernst Heinrich and Peter Pinten to General Aniline & Film Corp.
Tertiary amine reaction resinous product. No. 2,306,920. John M. Weiss and Robert P. Weiss to Research Corp.
Secondary amine reaction resinous product. No. 2,306,919. John M. Weiss and Robert P. Weiss to Research Corp.
Resinous amine reaction product. No. 2,306,918. John M. Weiss and Robert P. Weiss to Research Corp.
Production of urea-formaldehyde molding mixtures. No. 2,306,697. John E. Howard to Bakelite Corp.
Refining pine oleoresin. No. 2,306,653. William N. Traylor to Hercules Powder Co.
Refining wood rosin. No. 2,306,652. William N. Traylor to Hercules Powder Co.
Producing refined polymerized rosin. No. 2,306,651. William N. Traylor and Clell E. Tyler to Hercules Powder Co.
Refining polymerized rosin. No. 2,306,650. William N. Traylor and Clell E. Tyler to Hercules Powder Co.
Polyvinyl acetal resin. No. 2,306,586. Kenneth G. Blaikie and Robert N. Crozier to Shawinigan Chemicals Ltd.
Refining of rosin and the like. No. 2,306,455. Robert W. Martin to Hercules Powder Co.
Polymerization of rosin and rosin esters. No. 2,307,641. Alfred Rummelsburg to Hercules Powder Co.
Vinyl resin composition. No. 2,307,075. William Quattlebaum, Jr. and Donald Young to Carbide and Carbon Chemicals Corp.
Process for refining oleoresin. No. 2,307,078. Jesse Reed.
Stabilized vinyl resins. No. 2,307,090. Victor Yngve to Carbide and Carbon Chemicals Corp.
Vinyl resin molding compositions. No. 2,307,091. Victor Yngve to Carbide and Carbon Chemicals Corp.
Stabilized artificial resins. No. 2,307,092. Victor Yngve to Carbide and Carbon Chemicals Corp.
Stabilized vinyl resin. No. 2,307,157. William Quattlebaum, Jr. and Charles Noffsinger to Carbide and Carbon Chemicals Corp.
Preparing resin emulsion for water-base paints and with constant viscosity. No. 2,308,474. Harold C. Cheetham and Robert J. Myers to The Resinous Prods. & Chem. Co.
Dissolving a thermoplastic organic resin. No. 2,308,416. Robert K. Dreisbach to The Dow Chem. Co.
Sulfonated resin product and method of producing. No. 2,308,029. Alfred Rummelsburg to Hercules Powder Co.
Resin manufacture. No. 2,307,935-2,307,936. Robert Martin to Hercules Powder Co.
Preparation of resins for plugging formations. No. 2,307,843. Clyde Mathis and Carl Rampacek to Phillips Petroleum Co.
Resinous melamine-aldehyde condensation product. No. 2,308,069. Willi Fisch to Ciba Products Corp.

Rubber

Stretched rubber hydrochloride film which will shrink when heated. No. 2,301,222. Henry Minich.
Preservation of rubber. No. 2,303,708. Robert L. Sibley to Monsanto Chemical Co.
Method of treating rubber. No. 2,303,691. Marion W. Harman to Monsanto Chemical Co.
Vulcanization of rubber. No. 2,303,593. Ira Williams and Bernard Miller to E. I. du Pont de Nemours & Co.
Process for preparation of purified latex and rubber, gutta percha, balata, and the like. No. 2,303,430. Hendrik R. Braak to Rubber Stichting (Rubber Foundation).
Method and apparatus for heating and vulcanizing rubber and similar matter. No. 2,303,341. Rene Dufour and Henri Auguste Leduc.
Heat and sulfur resistant tire curing bag. No. 2,305,412. Per Frolich and Harris Hineline to Jasco, Inc.
Manufacture of synthetic rubber-like materials by emulsion polymerization of butadiene-1.3 hydrocarbons. No. 2,305,025. Cornelium Muhlhausen and Wilhelm Becker to Jasco, Incorporated.
Preparation of crude rubber. No. 2,304,858. William Steward and Edwin Newton to The B. F. Goodrich Co.
Method of vulcanizing a sulfur-vulcanizable rubber. No. 2,304,800. Howard Cramer to M. C. T. Corp.
Forming non-blooming rubber. No. 2,304,777. Theodore Bulifant to Allied Chemical & Dye Corp.
Rubber cement and method of making the same. No. 2,304,678. Russell Bush to The General Tire & Rubber Co.
Vulcanization accelerator. No. 2,304,568. Roy Hanslick to United States Rubber Co.
Method of separating scrapped vulcanized rubber. No. 2,304,554. Henry Dixon to The B. F. Goodrich Co.
Reclaimed rubber. Nos. 2,304,548-551. Paul Dasher to The B. F. Goodrich Co.
Process for heat-sensitizing latex. No. 2,304,335. Arthur Campbell to Commercial Solvents Corp.
Antioxidant for rubber. No. 2,306,830. Philip T. Paul to U. S. Rubber Company.
Vulcanization of rubber. No. 2,306,779. Clyde Coleman to United States Rubber Co.
Rubber hydrochloride composition. No. 2,306,731. George E. Hulse to United States Rubber Co.
Vulcanization of rubber. No. 2,306,669. Bernard M. Sturgis to E. I. du Pont de Nemours & Co.
Process for plasticizing synthetic rubberlike materials. No. 2,307,037. Walter Gumlich and Erich Konrad to Jasco Incorporated.
Method of making rubber hydrochloride film. No. 2,307,081. James Snyder to Wingfoot Corp.
Method of frothing latex. No. 2,307,082. Theodore Te Grotenhuis.
Manufacture of styrene. No. 2,308,229. Giulio Natta.
Producing clear rubber hydrochloride film. No. 2,308,186. George Lyon to Wingfoot Corp.
Rubber adherent composition. No. 2,307,801. Robert Pierce to National-Standard Co.

Textiles

Manufacturing water-repellent textile material. No. 2,301,676. Gerhard Balle, Johann Rosenbach and Ludwig Orthner to General Aniline & Film Corp.
Process of simultaneously finishing and dyeing textile fabric in one operation. No. 2,301,481. William Trowell to Hercules Powder Co.
Permanently sized textile fabric characterized by pliability and perviousness to both moisture and air and by having individual threads impregnated with solid thermoplastic composition. No. 2,301,480. William Trowell to Hercules Powder Co.
Imparting permanent water-repellence to cellulosic fabrics. No. 2,301,352. Edgar Wolf to Heberlein Patent Corp.
Process for improving properties of artificial textile materials containing organic derivatives of cellulose. No. 2,301,263. Henry Dreyfus and Robert Moncieff to Celanese Corporation of America.
Manufacture of cellulose ester hosiery. No. 2,303,934. Winfield W. Heckert to E. I. du Pont de Nemours & Co.
Textile finishing process. No. 2,303,773. William J. Thackston to Rohm & Haas Co.
Process and product for making textile and other material water repellent. No. 2,303,364. Erik Schirm to Heberlein Patent Corp.
Process for rendering textiles water-repellent and product therefrom. No. 2,303,363. Walther Kaase and Ernst Waltmann to Heberlein Patent Corp.
Production of artificial materials. No. 2,303,340. Henry Dreyfus to Celanese Corp. of America.
Manufacture of artificial materials. No. 2,303,339. Henry Dreyfus to Celanese Corp. of America.
Preparation of artificial filaments of threads. No. 2,303,338. Camille Dreyfus and George Schneider to Celanese Corp. of America.
Manufacture of rayon. No. 2,302,971. Adrian Moritz and Jan Schilthuis, and Bernice Crutchfield to American Enka Corp.
Method of bleaching textile materials. No. 2,302,936. Alden Burkholder to Industrial Rayon Corp.
Process for matting textile material in a bath of matting liquor. No. 2,302,778. Albert Landolt and Gustav Widmer and Hans Benz to Society of Chemical Industry in Basle.
Process of matting textile materials. No. 2,302,779. Albert Landolt, Hans Benz to Society of Chemical Industry in Basle.
Process for delustering textile material. No. 2,302,777. Albert Landolt and Gustave Widmer and Hans Benz to Society of Chemical Industry in Basle.
Coloration of textile materials. No. 2,306,283. George Schneider to Celanese Corp.
Delustering yarn by adsorption of pectized amino-protein colloid. No. 2,305,006. Robert Hold and Victor Le Gloahec.
Preventing precipitation of calcium sulfate in sulfuric acid baths used for carbonizing wool. No. 2,304,791. Edward Bell to Hall Laboratories, Inc.
Treatment of dyed textile fabric. No. 2,304,435. Thomas Bell to E. I. du Pont de Nemours & Co.
Spinning artificial silk. No. 2,304,212. Percy Sowter and William Harries to Celanese Corporation of America.
Process for improving textiles. No. 2,304,157. Max Engelmann and Joseph Pikl to E. I. du Pont de Nemours & Co.
Treated textile product. No. 2,304,113. Willard Morgan and Earle McLeod to Arnold, Hoffmann & Co.
Process of producing artificial fibrous material. No. 2,304,089. Georg Heberlein.
Coated fabric. No. 2,307,225. Robert Lester to E. I. du Pont de Nemours & Co.
Process of producing effects on textile material. No. 2,307,118. Ernst Doring and Hans Grassmader to General Aniline & Film Corp.
Textile printing paste. No. 2,307,097. Louis Anderson, Jr. to Hercules Powder Co.
Improving resistance to wear and soiling of suede-like flock finished fabric. No. 2,308,429. Russell G. Smith and Willis J. Physioc to Atlas Powder Co.
Lubricant for textiles comprising a synthetic oleic glyceride. No. 2,308,355. Ivor M. Colbeth to The Baker Castor Oil Co.
Production of glazed fabrics. No. 2,307,876. Harry Corteen to Tootal Broadhurst Lee Company Ltd.
Method of spinning artificial filaments. No. 2,307,864. Roy Soukup to E. I. du Pont de Nemours & Co.
Spinning of artificial filaments. No. 2,307,863. Roy Soukup to E. I. du Pont de Nemours & Co.
Process for reducing the residual shrinkage of reiented synthetic linear polyamide structures of filaments, yarns, ribbons, sheets and woven fabrics. No. 2,307,846. John Miles to E. I. du Pont de Nemours & Co.
Spinning of cellulose acetate gum. No. 2,308,141. Francis Alles to E. I. du Pont de Nemours & Co.

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Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published November 10, 1942.

Method of decolorizing liquids by contacting them with a decolorizing material containing substantial proportion of hydrated magnesium silicate. No. 408,452. Lyle Caldwell.

Method of producing moist self-preserving brewers' yeast food of semi-solid consistency from fresh bottom or top brewers' yeast. No. 408,459. William P. M. Grelck.

Method of smoking meat while wrapped in regenerated cellulose and a stocking net. No. 408,468. Bernard Paslawski.

Refrigerating apparatus. No. 408,469. Arthur J. Pedigo.

Producing weld-stable chromium-containing steel containing about 0.03% or less of carbon. No. 408,474. Sigurd Westberg.

Paper-making machine. No. 408,476. Allied Chemical & Dye Corporation. (William A. Perry).

Rubber composition which is the vulcanization product of a mixture comprising rubber, vulcanizing agent, a diaryl guanidine activatable sulfur-containing accelerator, and the non-hygroscopic resin-like addition product of zinc chloride and a diaryl guanidine. No. 408,477. American Cyanamid Company. (Arnold R. Davis).

Manufacture of a cornstarch-protein canned food thickener. No. 408,478. American Maize-Products Company. (James F. Walsh and Archie L. Rawlins).

Copper-containing metal having a treated surface formed by contact action of a persulfate and being substantially inactive towards solutions containing active oxygen. No. 408,486. Buffalo Electro-Chemical Company, Inc. (Hans O. Kauffmann and Robert L. McEwen).

Translucent, luminescent glass in which the components rendering the glass translucent consist of luminescent materials segregated out in the crystalline form, the glass being substantially free from alkalies. No. 408,488. Canadian General Electric Company, Limited. (Walter Hänlein).

Lead glaze comprising about 40-60% lead oxide, 15-30% silica, 1% aluminum oxide and a small amount not exceeding about three percent of alkali oxides. No. 408,489. Canadian General Electric Company Limited. (Raymond W. Goodwin).

Comminuted material dispensing device. No. 408,499. Canadian Germicide Company Limited. (Willard B. Eddy).

Particle-size reducing apparatus. No. 408,500. Canadian Industries Limited. (Charles E. Berry).

Particle-size reducing apparatus and pigment prepared therewith. No. 408,501. Canadian Industries Limited. (Charles E. Berry).

Photographic halide emulsion comprising a finely dispersed silver halide in a mixture of a water-soluble starch acetate and a polyvinyl fatty acid ester having a vinyl acylate content of 0.5-5%, substantially the remainder being vinyl alcohol. Canadian Kodak Company Ltd. (Wesley G. Lowe).

Photographically sensitive material comprising a supporting sheet and a sensitive layer thereon comprising metallic salts of cellulose. No. 408,503. Canadian Kodak Company Ltd. (John Russell).

Photographic element containing a dye formed by coupling a tetrazotized diamino triphenyl methane with an amino-phenol sulfonic acid. No. 408,504. Canadian Kodak Company Ltd. (Cyril J. Staud and Walter J. Weyerts).

Photographic element comprising a support having thereon a sensitive emulsion layer and an anti-halation layer of an alkali-soluble synthetic colloidal material containing colloidal carbon dispersed therein with a dispersing agent. No. 408,505. Canadian Kodak Company Ltd. (Cyril J. Staud and Walter J. Weyerts).

Photographic paper comprising paper coated with a coating comprising barium sulfate and a water-susceptible acyl cellulose. No. 408,506. Canadian Kodak Company Ltd. (Halford R. Clark).

Tanning agent comprising the water soluble product of a reaction between an alkaline earth metal gluconate and a sulfuric acid solution of titanium. No. 408,507. Canadian Titanium Pigments Limited. (Walter K. Nelson).

Refrigerating apparatus. No. 408,510. Canadian Westinghouse Company Limited. (Robert H. Tull).

Refrigerating apparatus. No. 408,511. Canadian Westinghouse Company Limited. (Anthony A. Quimper).

Refrigerator cabinet. No. 408,514. Canadian Westinghouse Company Limited. (Howard D. White).

Refrigerating apparatus. No. 408,515. Canadian Westinghouse Company Limited. (Carl F. Nystrom).

Refrigeration apparatus. No. 408,516. Canadian Westinghouse Company Limited. (Elliott E. Grover and Albert E. Truelove).

Sterilizing unit generating ultraviolet radiations of highly bactericidal action. No. 408,520. Canadian Westinghouse Company Limited. (Joseph F. Collins).

Refrigeration apparatus. No. 408,523. Canadian Westinghouse Company Limited. (Milton Kalischer).

Fibrous pulp molding machine. No. 408,536. The Canal National Bank of Portland, Trustee-Assignee of Keyes Fibre Company. (Walter H. Randall).

Method of electroplating metallic articles with a chemical solution containing non-volatile solutes which include the steps of immersing the metallic article in said chemical solution, recovering substantially all of the residual chemical solution which results from the immersion by rinsing the surface of the metallic article with a solution containing the non-volatile solutes of said chemical solutions in dilute form, collecting the rinse solution, and recovering substantially all of the non-volatile solutes from said rinse solution after it has acquired an appreciable increase in the said non-volatile solutes. No. 408,537. Carnegie-Illinois Steel Corporation. (Ewart S. Taylerson and Warren M. Trigg).

Ice cream freezer. No. 408,538. Cherry-Burrell Corporation. (Charles F. Weinrich).

Zinc soap of coconut oil acids in combination with an amine capable of rendering the zinc soap soluble in organic solvents in which the zinc soap is ordinarily incompletely soluble. No. 408,542. Dominion Rubber Company Limited. (William Pieter ter Korst).

Producing colored photographic prints by producing a master picture by exposure and color forming development of a photographic multi-layer element, and printing said master picture onto another multi-layer element in which the color separation pictures are produced partly by the bleaching-out of dyes by means of the silver image and partly by toning. No. 408,546. General Aniline & Film Corporation. (John Eggert and Gerd Heymer).

Treating a gas mixture for extracting acidic gaseous constituents therefrom and simultaneously adjusting the moisture content thereof. No. 408,549. The Girdler Corporation. (Robert R. Bottoms).

Producing a metal-phthalocyanine coloring matter by heating together urea, a metalliferous reagent capable of supplying a metal selected from the group consisting of iron, nickel, cobalt, aluminum, chromium and copper, and an orthoarylene derivative selected from the group consisting of orthoarylene anhydrides, the corresponding free acids, ammonium salts of said acids, monoamides of said acids, diamides of said acids, the imides and imimides of said acids, the orthoarylenecyanocarboxylic acids, ammonium salts of the latter and an arylene polycarboxylic acid containing more than two carboxylic acid groups and in which at least two of the carboxylic acid groups occupy adjacent positions. No. 408,557. Imperial Chemical Industries Limited. (Max Wyler).

Sterilizing fibrous materials by treating them with a small quantity of phenyl mercuric nitrate. No. 408,558. Industrial Patents Corporation. (Charles E. Lennox).

Treating meat by removing muscle from the skeletal structure during rigor mortis. No. 408,559. Industrial Patents Corporation. (Beverly E. Williams and Leon L. Caldwell).

Chocolate syrup for use in preparing non-settling chocolate flavour beverages comprising cocoa, sugar, quince seed mucilage, flavoring material and water. No. 408,566. Krim-Ko Company. (Arthur E. Siehrs).

Producing a matrix for the electroforming of foraminous sheet. No. 408,573. Edward O. Norris, Inc. (Edward O. Norris).

Rubber bonded abrasive article comprising a screenable, pourable, dry, granular mix consisting of abrasive granules each coated with only rubber as an organic bond with sulfur and a filler of inert material to the extent of at least 25% by volume of the bond. No. 408,574. Norton Company. (Richard H. Martin).

Abrasive metal carbide producing apparatus. No. 408,575. Norton Company. (Raymond R. Ridgway).

Apparatus for carrying out chemical reactions. No. 408,582. Shell Development Company. (Frederick M. Pyzel).

Manufacture of cyclic amidines by causing an aliphatic diamine to react with an amino acid having the nitrogen atom an aromatic or a heterocyclic residue as a substituent or a derivative of such an acid. No. 408,585. Society of Chemical Industry in Basle. (Karl Miescher, Willi Klarer and Ernest Urech).

Manufacture of amino acid amidines by causing a reactive ester of an oxyalkylamidine to react with an amine. No. 408,586. Society of Chemical Industry in Basle. (Karl Miescher, Willi Klarer and Ernest Urech).

Manufacture of mixed ether by heating a mixture of methyl alcohol and sulfuric acid and water at a pressure not above about atmospheric pressure and at a temperature above that at which the resulting ethers will boil, adding a mixture of methyl alcohol and tertiary butyl alcohol, rapidly removing volatile vapors as formed, fractionating the alcohols and recycling the said alcohols substantially free of ethers to the heated mixture of acid and alcohol. No. 408,587. Standard Alcohol Company. (Edwin R. Gilliland).

Rubber composition comprising rubber and about 5-80% by weight of a copolymer of isobutylene and styrene, having a molecular weight above 800. No. 408,588. Standard Oil Development Company. (Peter J. Gaylor).

Isobutenyl chloride polymerization product comprising a mixture of polymers of isobutenyl chloride of substantially the same content as the isobutenyl chloride, said product being a light colored liquid boiling between about 75° and 205°C. insoluble in water and soluble in mineral oils. No. 408,589. Standard Oil Development Company. (William J. Sparks and Robert M. Thomas).

Electrically fired borehole gun. No. 408,592. Standard Oil Development Company. (Robert R. Thompson).

Clay catalyst produced by "over-treating" clay with a reagent. No. 408,593. Standard Oil Development Company. (Kenneth K. Kearby).

Method comprising reacting upon a 3-methyl-4.7-dihalogen quinoline with an alkylenediamine containing at least one non-tertiary amino group. No. 408,612. Winthrop Chemical Co., Inc. (Hans Andersag, Stefan Breitner and Heinrich Jung).

Process for the production of crepe yarn of filaments of an organic derivative of cellulose. No. 408,617. Camille Dreyfus. (George Schneider and William Whitehead).

Process for the production of crepe effects on fabrics containing yarn of filaments of an organic derivative of cellulose. No. 408,618. Camille Dreyfus. (Nathaniel C. Shane).

Process for the production of crepe effects on fabrics comprising yarns of filaments of cellulose acetate. No. 408,619. Camille Dreyfus. (Cyril M. Croft and William J. Cramer, Jr.).

Extraction of distillable liquid and crystalline products from lignin-containing plant material. No. 408,625. Harold Hibbert and Archibald B. Cramer.

Granted and Published November 17, 1942.

Jordan lining made up of separate metal operating knives, each knife kept separated from the adjoining knives and held in place by a hardened material so molded when soft as to conform exactly to part of the adjoining side surfaces of the knives and also held by other metal members buried in the hardened material. No. 408,631. Archer LeRoy Bolton.

Tube mill lining. No. 408,638. Warren L. Howes.

Evacuation method for gas and powdery material. No. 408,643. Pierre Philippon.

Machinable grey cast iron having an all-pearlitic metallographic structure. No. 408,647. Horace John Young.

Producing catalyst from metals and organic acids or anhydrides. No. 408,648. Allied Chemical & Dye Corporation. (Augustus S. Houghton).

Producing catalyst by reacting metal with a solution containing alkali metal hypohalite and caustic alkali. No. 408,649. Allied Chemical & Dye Corporation. (August S. Houghton).

Metal pellet forming apparatus. No. 408,650. Aluminum Company of America. (John C. Hoar).

Electrode for spark plugs and the like containing 10-30% chromium, 1-10% silicon and the remainder substantially pure iron. No. 408,654. The American Steel and Wire Company of New Jersey. (Hugh S. Cooper).

Electrostatic coating process for coating with comminuted material such as flock. No. 408,657. Behr-Manning Corporation. (John O. Amstuz).

Glass of a high softening point containing silicon oxide, aluminum oxide, thorium oxide, zirconium oxide, calcium oxide, barium oxide and beryllium oxide. No. 408,661. Canadian General Electric Company Limited. (Walter Hänlein).

Refractory glass consisting of approximately 56% silica, 15% calcium oxide, 19% alumina, 6% magnesium oxide, 1% zinc oxide and 3% barium oxide. No. 408,662. Canadian General Electric Company Limited. (John H. Partridge).

Mixing device for slurries and the like. No. 408,672. Canadian Gypsum Company Limited. (Thomas C. Camp).

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New Trade Marks of the Month

TRACE-O-FILM
400,013

Idaho
400,030

SOFTWOOD
400,269

THORO-PRUF
400,281

MALLORY
400,385

ACRYL
442,641

448,890

448,896

CAURAS
448,914

C. P.
449,256

CELOTEX
449,669

ALCUT
450,119

KERSOL
450,120

ZERO-CUT
450,128

Spotlight

452,341

Stripsoff
453,247

CARRAGAR
455,163

D-11
4 45,398

CHEMACO
455,398

ALCOFOAM
455,878

FLEXOID
456,201

MARVEL-KOTE
456,270

Barrett
456,484

SILCAZ
456,505

PENACOL
PENACOLITE
456,542

BUCA
456,926

Gamal
456,939

NEVTEX
457,066

NEVSOL
457,067

Florex
457,286

STANOX
457,328

E-TOPLEX
457,353

AIRALOY
457,361

BABOSIL
457,575

POLY-TAC
457,590

D.N.
111
457,604

CAL-MAG
457,630

LUCIDERM
457,799

Trade Mark Descriptions

400,013. Edwin N. Scully, Chicago, Ill.; Mar. 28, '40; for cellulose acetate film, coated (matte finish); since July 1, '39.

400,030. Idaho Potato Starch Co.; Blackfoot, Idaho; June 26, '42; for potato starch for industrial purposes; since Oct. 15, '41.

400,269. Sears, Roebuck and Co., Chicago, Ill.; Dec. 13, '39; for plastic substance; since July 15, '38.

400,281. Warwick Chemical Co., West Warwick, R. I.; Jan. 31, '42; for textile treated chemicals; since Dec. 26, '41.

400,385. P. R. Mallory & Co., Inc., Indianapolis, Ind.; Apr. 11, '42; for metallurgical products; since July, '36.

442,641. Turco Products, Inc., Los Angeles, Calif.; Apr. 16, '41; for inhibitor used in acid solutions in metal pickling and hard water scale removal operations; since Apr. 28, '37.

448,890. The Atlantic Refining Co., Phila., Pa.; Nov. 25, '41; for lubricating oils; since Nov. 25, '37.

448,896. The Atlantic Refining Co., Philadelphia, Penna.; Nov. 25, '41; for lubricating oils; since Nov. 25, '37.

448,914. Armin J. Kraus, North Bergen, N. J.; for plastic and elastic substance useful as a rubber substitute; since Oct. 25, '41.

449,256. The Flintkote Co., New York, N. Y.; Dec. 8, '41; for bituminous roof insulation cement; since Jan., '41.

449,669. The Celotex Corp., Chicago, Ill.; Dec. 22, '41; for heavy bodied and light bodied water-proof adhesives; since Feb. 14, '38.

450,119. Sulflo Inc.; Elizabeth, N. J.; Jan. 9, '42; for metal cutting lubricating compounds; since May 15, '40.

450,120. Sulflo Inc., Elizabeth, N. J.; Jan. 9, '42; for metal cutting lubricating compound; since Nov. 2, '39.

450,128. Sulflo, Inc., Elizabeth, N. J.; Jan. 9, '42; for metal cutting lubricating compound; since Mar. 8, '40.

452,341. York Pharmacal Co., St. Louis, Mo.; Apr. 14, '42; for dry cleaning fluid; since Nov. 1, '41.

453,247. Otto E. Linick (Soilicide Labs); Montclair, N. J.; May 25, '42; for chemical preparation for removing wall paper; since May 29, '41.

455,163. Krim-Ko Company, Chicago, Ill.; Aug. 28, '42; for emulsifying, jellying, sizing, suspending and stabilizing agent; since Aug. 21, '42.

445,385. Eastman Kodak Co., Jersey City, N. J. and Rochester, N. Y.; July 16, '41; for photographic developers; since Feb. 24, '37.

455,398. Manufacturers Chemical Corp., Berkeley Heights, N. J.; Sept. 7, '42; for cellulose acetate plastic molding materials in pulp and granulated form; since Aug. 31, '42.

455,878. American-La France Foamite Corp., Elmira, N. Y.; Oct. 1, '42; for fire extinguishing preparations; since July 30, '42.

456,201. Sillers Paint & Varnish Co., Los Angeles, Calif.; Oct. 14, '42; for liquid composition as a rubber dressing; since '34.

456,270. Kansas Building Materials Co., Topeka, Kans.; Oct. 19, '42; for concrete curing compound; since Sept. 4, '42.

456,484. Allied Chemical & Dye Corp., New York, N. Y.; Oct. 28, '42; for roofing cement and bituminous base coating compositions; since May, '40.

456,505. Electro Metallurgical Co., New York, N. Y.; Oct. 29, '42; for ferrous metal alloys; since Oct. 31, '39.

456,542. Pennsylvania Coal Products Co., Petrolia, Penna.; Oct. 30, '42; for synthetic resins, organic resinous condensation products; since Jan. 24, '22 for word "Penacol" and since Oct. 11, '41 for composite mark.

456,926. Moore & Munger, New York, N. Y.; Nov. 19, '42; for manufacture of synthetic rubber; since Nov. 9, '42.

456,939. Fisher Scientific Co., Pittsburgh, Penna.; Nov. 20, '42; for aluminum oxide suspension for polishing; since Nov. 16, '42.

457,066. The Neville Co., Neville Island, Pittsburgh, Penna.; Nov. 26, '42; for plasticized coumarine-indene polymer; since Aug. 17, '42.

457,067. The Neville Company, Neville Island, Pittsburgh, Pa.; Nov. 26, '42; for liquid hydrocarbon solvents; since June 17, '42.

457,286. The Rubber City Manufacturing Co., Akron, O.; Dec. 8, '42; for chemical dye preparation; since April '41.

457,328. California Spray-Chemical Corp., Wilmington, Del.; and Richmond, Calif.; Dec. 11, '42; for insecticides; since Sept. 8, '42.

457,353. U. S. Vitamin Corp., New York, N. Y.; Dec. 11, '42; for beta and gamma vitamin E concentrate; since Sept. 1, '42.

457,361. Diamond Magnesium Co., Painesville, O.; Dec. 12, '42; for magnesium and magnesium alloys; since Dec. 3, '42.

457,575. The Harshaw Chemical Co., Cleveland, O.; Dec. 23, '42; for barium borosilicate; since Oct. 8, '42.

457,590. Newport Industries, Inc., Pensacola, Fla.; Dec. 24, '42; for resin plasticizer; since Dec. 10, '42.

457,604. The Dow Chemical Co., Midland, Mich.; Dec. 26, '42; for insecticide; since May 11, '42.

457,630. The Natural Lime & Stone Co., Findlay, O.; Dec. 28, '42; for acid neutralizer for commercial fertilizers; since Nov. 5, '42.

457,799. Wallace & Tiernan Products Inc., Belleville, N. J.; Jan. 7, '43; for germicidal compositions; since Dec. 15, '42.

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